AD-A214 918

DTIC ACCESSION NUMBER

PHOTOGRAPH THIS SHEET

DTIC FILE COPY

LEVEL

INVENTORY

AFOSR TR 89-1539

DOCUMENT IDENTIFICATION

Sept 86

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

DISTRIBUTION STATEMENT

ACCESSION FOR	
NTIS GRA&I	☒
DTIC TAB	☐
UNANNOUNCED	☐
JUSTIFICATION	
BY	
DISTRIBUTION /	
AVAILABILITY CODES	
DIST	AVAIL AND/OR SPECIAL
A-1	

DISTRIBUTION STAMP

DTIC
ELECTE
DEC 05 1989
S E D

DATE ACCESSIONED

DATE RETURNED

89 12 04 132

PHOTOGRAPH THIS SHEET AND RETURN TO DTIC-FDAC

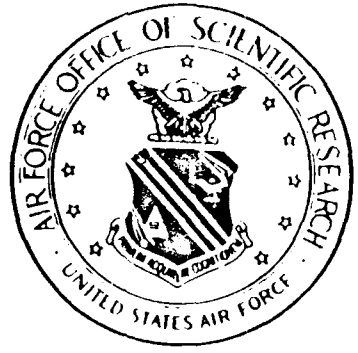
DTIC FORM 70A

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

Air Force Systems Command

AFOSR

TECHNICAL REPORT SUMMARIES



JULY - SEPTEMBER 1986

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S) AFOSR-TR- 89-1539
6a. NAME OF PERFORMING ORGANIZATION: AFOSR 6b. OFFICE SYMBOL (If applicable):	7a. NAME OF MONITORING ORGANIZATION: AFOSR/XOTD
6c. ADDRESS (City, State, and ZIP Code): BUILDING 410 BOLLING AFB DC 20332-6448	7b. ADDRESS (City, State, and ZIP Code): BUILDING 410 BOLLING AFB DC 20332-6448
8a. NAME OF FUNDING/SPONSORING ORGANIZATION: AFOSR 8b. OFFICE SYMBOL (If applicable): XOTD	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER: IN-HOUSE
8c. ADDRESS (City, State, and ZIP Code): BUILDING 410 BOLLING AFB DC 20332-6448	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO.: N/A PROJECT NO.: N/A TASK NO: N/A WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
AFOSR TECHICAL REPORT SUMMARIES

12. PERSONAL AUTHOR(S)
[illegible]

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
QUARTERLY	FROM [illegible] TO Sep 89		

16. SUPPLEMENTARY NOTATION

17 COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The AFOSR Technical Report Summaries are published quarterly of each calendar year They consist of a brief summary of each AFOSR technical report received in the Technical Information Division and submitted to the Defense Technical Information Center for that quarter.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☐ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	unclassfied
22a. NAME OF RESPONSIBLE INDIVIDUAL: DEBRA L. TYDELL	22b. TELEPHONE (Include Area Code): (202) 767-4912 / 22c. OFFICE SYMBOL: XOTD

DD Form 1473, JUN 86 — Previous editions are obsolete. — SECURITY CLASSIFICATION OF THIS PAGE

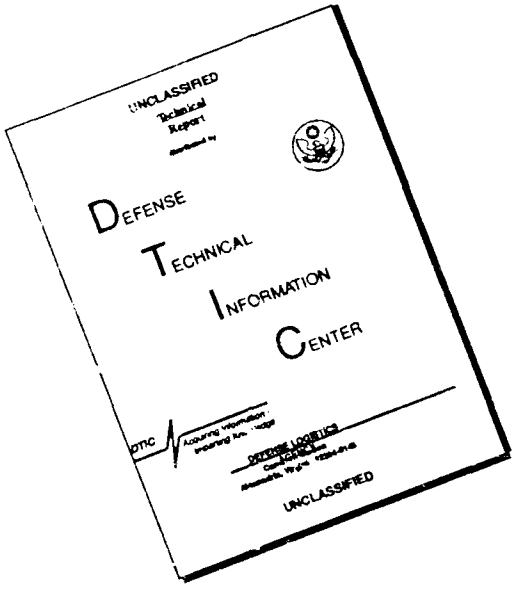
AFOSR

TECHNICAL REPORT SUMMARIES

THIRD QUARTER 1986

PREPARED BY:
DEBRA TYRRELL, CHIEF
TECHNICAL DOCUMENTS SECTION
AFOSR/XOTD
BOLLING AFB, DC 20332-6448
(202) 767-4912 or AUTOVON 297-4912

DISCLAIMER NOTICE



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

INTRODUCTION

The Air Force Office of Scientific Research Technical Report Summaries are published quarterly as of March, June, September, and December of each calendar year. They consist of a brief summary of each AFOSR technical report received in the Technical Information Division and submitted to the Defense Technical Information Center (DTIC) for that quarter. The summaries contain two indexes for easily locating the technical reports that may be of interest to the user. These are followed by abstracts of the reports.

1) SUBJECT INDEX

   a. Subject Field
   b. Title of Report
   c. AD Number (Accession Number)

2) PERSONAL AUTHOR INDEX

   a. Primary Author
   b. Title of Report
   c. AD Number

AFOSR does not maintain copies of technical reports for distribution. However, you may obtain any of these reports if you are a registered government agency or government contractor with DTIC, by requesting the AD number of that report from the DTIC, Cameron Station, Alexandria, Virginia, 22314.

PURPOSE

The purpose of this report is to inform Air Force Laboratories about the science that the Air Force Office of Scientific Research is supporting.

AFOSR MISSION

The Air Force Office of Scientific Research (AFOSR) is the Single Manager of the Air Force Defense Research Sciences Program (Program Element 61102F) and the primary Air force agency for the extramural support of fundamental scientific research. The AFOSR is organizationally under the DCS/Science and Technology, Air Force Systems Command.

AFOSR awards grants and contracts for research in areas of science relevant to the needs of the Air Force. Research is selected for support from unsolicited proposals originating from scientists investigating problems involving the search for new knowledge and the expansion of scientific principles. Selection is on the basis of scientific potential for improving Air Force operational capabilities, originality, significance to science, the qualification of the principal investigators, and the reasonableness of the proposed budget.

KEY TO READING THE DATA

The summaries consist of two indexes and the abstracts. From one of the two indexes, locate the AD number of the report that is of interest to you. Use this number to locate the abstract of the report in the abstracts section. The first report submitted to DTIC during the quarter (the one with the lowest AD number) appears on the last page of the abstracts section. The last report submitted to DTIC during the quarter (the one with the highest DTIC number) appears on the first page of the abstracts section. The following terms will give you a brief description of the elements used in each summary of this report.

DTIC Report Bibliography - DTIC's brief description of a technical report.

Search Control Number - A number assigned by DTIC at the time a bibliography is printed.

AD Number - A number assigned to each technical report when received by the DTIC.

Field & Group Numbers - (appearing after the AD number) First number is the subject field and the second number after the slash is the particular group under that subject field.

Corporate Author/Performing Organization - The organization; e.g., college/university, company, etc., at which the research is conducted.

Title - The title of the technical report.

Descriptive Note - Gives the type of report; e.g., final, interim, etc., and the period of the time of the research.

Date - Date of the technical report.

Pages - Total number of pages contained in the technical report.

Personal Author - Person or persons who wrote the report.

Contract/Grant Number - The instrument control number identifying the contracting activity and funding year under which the research is initiated.

Project Number - A number unique to a particular area of science; e.g., 2304 is the project number for mathematics.

Task Number - An alphanumeric number unique to a specific field of the main area of science; e.g., 2304 is the project number for mathematics and A3 is the task number for computational sciences.

Monitor Number - The number assigned to a particular report by the government agency monitoring the research. The number consists of the government monitor acronym, the present calendar year and the technical report assigned consecutively; e.g., AFOSR-TR-83-0001 is the first number used for the first technical report processed for Calendar Year 1983.

Supplementary Note - A variety of statements pertaining to a report. For example, if the report is a journal article, the supplementary note might give you the journal citation, which will include the name of the journal the article it appears in, and the volume number, date, and the page numbers of the journal.

Abstract - A brief summary describing the research of the report.

Descriptors - Key words describing the research.

Identifiers - Commonly used designators, such as names of equipment, names of projects or acronyms, the AFOSR project and task number, and the Air Force Research Program Element number.

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH SCIENTIFIC STAFF DIRECTORY
BOLLING AIR FORCE BASE, DC 20332

CC/CD - OFFICE OF THE DIRECTOR

Commander Col Alan J. Driscoll	5017
Technical Director Dr John O. Dimmock	5018

NA - DIRECTORATE OF AEROSPACE SCIENCES	EXT
Director Dr Michael Salkind	4987
Visiting Prof Dr. Albert Wang	4937
Prog Mgr Dr Anthony Amos	4937
Prog Mgr Dr Spencer Wu	4935
Prog Mgr Dr Julian Tishkoff	4935
Prog Mgr Dr James McMichael	4935
Visiting Prof Dr Robert Vondra	4937
Prog Mgr Maj George Haritos	4937

NC - DIRECTORATE OF CHEMICAL AND ATMOSPHERIC SCIENCES	
Director Dr. Donald Ball	4960
Prog Mgr Lt Col James Koelmer	4963
Prog Mgr Maj Larry W Burggraf	4963
Prog Mgr Maj Larry P. Davis	4963
Prog Mgr Dr Donald Ulrich	4963
Prog Mgr Dr Anthony Matuszko	4963
Prog Mgr Dr Francis Wodarczyk	4963

NE - DIRECTORATE OF ELECTRONIC AND MATERIAL SCIENCES	
Director Dr Horst R. Wittman	4984
Dep Director Dr Alan Rosenstein	4984
Prog Mgr Capt. Kevin J. Malloy	4931
Prog Mgr Lt Col Robert W. Carter, Jr.	4931
Prog Mgr Maj Joseph Hager	4933
Prog Mgr Dr Clyde Giles	4933
Visiting Prof Mgr Dr Harold Weinstock	4931
Prog Mgr Dr Gerald Witt	4931

NL - DIRECTORATE OF LIFE SCIENCES	EXT
Director Dr Robert K. Dismukes	4278
Prog Mgr Dr William O. Berry	5021
Prog Mgr Dr Alfred Fregly	5024
Prog Mgr Lt Col Cockerham	5021
Prog Mgr John Tangney	5021

NM - DIRECTORATE OF MATHEMATICAL & INFORMATION SCIENCES	
Director Maj James Crowley	5025
Prog Mgr Capt John Thomas	5026
Visiting Prof Dr. Sam Rankin III	5028
Prog. Mgr Mar Brian Woodruff	5028
Prog Manager Dr. Arje Nachman	5028
Visition Prof Dr Vincent Sigillito	5028

NP - DIRECTORATE OF PHYSICAL AND GEOPHYSICAL SCIENCE	
Director Col Hugo Weichel	4904
Prog Mgr Maj Bruce Smith	4908
Prog Mgr Dr. Henry R. Radoski	4906
Prog Mgr Maj John Prince	4908
Prog Mgr Dr Howard R. Schlossberg	4907
Prog Mgr Dr Robert Barker	5011
Prog Mgr Ralph Kelley	4908

Commercial (202) 767-XXXX
Autovon 297-XXXX

SUBJECT INDEX

SUBJECT INDEX

Synth ... Properties, and Addition of H... ...n Halides.
AD-A170 ...

•POLYPH... ...ES
R... ...t: Spectroscopic Analysis of P... ...phenylene benz... ...iazole) Films.
AD-A168 ...

•POLYSIL... ...
R... ...t: The Polysilane High Poly...
AD-A170 ...

•POWDER ... ...S
M... ...stic Understanding of Powd... ...paction in Metals.•
AD-A170 ...

•POWDERS
Hot ... ...static Pressing of Ceram... ...wder Compacts.•
AD-A169 ...

•PRECIPI... ...N
A... ...etical Framework for Exam... Geographical Variability in th... ...rophysical Mechanisms of Preci... ...tion Development.•
AD-A170 ...

•PRIMARY ... (SEISMIC WAVES)
At... ...stion in the Western Great Basin
AD-A169 ...

•PROBABI...
Pr... ...listic Analysis of Algor... ...s for NP-Complete Probl... •
AD-A168 ...

•PROBABI... ... DISTRIBUTION FUNCTIONS
M... ...ation for Discrete Data: Asym... ... Distribution Theory and Impli... ...ns.•
AD-A168 ...
Pa... ...n Recognition Based on Scale... ...riant Discriminant Funct... •

AD-A170 809

•PROBLEM SOLVING
Distributed Knowledge Base Systems for Diagnosis and Information Retrieval.•
AD-A170 830

•PROJECTIVE TECHNIQUES
Reprint: Estimation of the Error in the Reduced Basis Method Solution of Nonlinear Equations.
AD-A169 955

•PROPYL RADICALS
Studies of Organophosphate Effects on Retinal Physiology, Cell Biology and Biochemistry.•
AD-A170 200

•PROTECTIVE COATINGS
Advanced High Temperature Coating Systems Beyond Current State of the Art Systems.•
AD-A170 182

•PROTEINS
Role of Protein Phosphorylation in Regulation of Bioreactivity.•
AD-A170 024

•PROTON ACCELERATORS
Interim Scientific Report for the Induction Linac Program.•
AD-A170 905

•PULSE GENERATORS
Coordinated Research Program in Pulsed Power Physics.•
AD-A169 113
Interim Scientific Report for the Induction Linac Program.•
AD-A170 905

•PULSED LASERS
Picosecond Electronics and Optoelectronics Held at Incline Village, Nevada on 13-15 March 1985.•
AD-A168 885
Picosecond Nonlinear Resonant Interactions in Semiconductors.•
AD-A170 970

•QUANTUM ELECTRONICS
Picosecond Electronics and Optoelectronics Held at Incline Village, Nevada on 13-15 March 1985.•
AD-A168 885
Quantum 1/f Noise in Submicron Devices and Quartz Resonators.•
AD-A170 739

•QUENCHING
Reprint: Potentials for Weakly Bound States in I2 from Diffuse Spectra and Predissociation Data.
AD-A168 848

•QUEUEING THEORY
DFR (Decreasing Failure Rate) Property of First Passage Times and Its Preservation under Geometric Compounding.•
AD-A168 671
Optimal Idle and Inspection Periods for M/G/1 Queues.•
AD-A170 110
Reprint: A Single Server Queue in a Hard-Real-Time Environment.
AD-A170 915

•RADAR TRACKING
Reprint: A High Resolution Algorithm for Combined Time-of-Arrival and Direction-of Arrival Estimation.
AD-A169 073

•RADIO TRANSMISSION
Spread Spectrum Mobile Radio Communications.•
AD-A168 484

•RANDOM NUMBER GENERATORS
The Total Hazard Construction, Antithetic Variates and Simulation of Stochastic Systems.•
AD-A170 265

•RANDOM VARIABLES

PERSONAL AUTHOR INDEX

H... Specific Heat Dielectrics
and ... ...a Resistance at
Diele... ...c Boundaries.
(AFO... ...86-0477)
AD-A169 ...

* * *

85 ...-NUTRN-R2
P... ...m to Develop an Optical
Trans... ... and Switch.
(AFOS... ...86-0544)
AD-A170 ...

•WISCONS... ...NIV-MADISON DEPT OF
CHEMI...

* * *

A... ...t Cyclopolysilane Anion-
Radic... ...(i-Pr2Si)4.
(AFOS... ...86-0590)
AD-A170 ...

* * *

Th... Polysilane High Polymers.
(AFOS... ...86-0585)
AD-A170 ...

* * *

X... Crystal Structure and
Confo... ...ional Analysis of
Tetra... ...ethylcycloheptasilane,
(Me2Si...
(AFOS... ...86-0583)
AD-A170 ...

* * *

IR ...nsition Moment Directions
in Mat... Isolated Dimethylsilylene
and 1-... ...ylsilene,
(AFOSR... ...86-0586)
AD-A170 ...

* * *

Pol... ...ilane High Polymers with
Olefin... Side Groups: Synthesis,
Proper... ..., and Addition of
Hydro... ...alides,
(AFOSR... ...86-0589)
AD-A170 ...

•WISCONSI... ...IV-MADISON DEPT OF
COMPUT... SCIENCES

* * *

SO... ...uccessive Over-
Relaxa... ...) MGR (Multigrid
Algori... ...(nu) Experiments on the
Crystal... ...lticomputer,
(AFUSR-TR-86-0411)
AD-A169 929

•YALE UNIV NEW HAVEN CONN

* * *

Population Inversions in Laser-
Initiated Vacuum Arcs.
(AFOSR-TR-86-0522)
AD-A170 811

•YALE UNIV NEW HAVEN CONN SCHOOL OF
MEDICINE

* * *

Studies of Organophosphate
Effects on Retinal Physiology, Cell
Biology and Biochemistry.
(AFOSR-TR-86-0498)
AD-A170 200

•YALE UNIV NEW HAVEN CT DEPT OF
OPHTHALMOLOGY AND VISUAL SCIENCE

* * *

Limits of Pattern
Discrimination in Human Vision.
(AFOSR-TR-86-0569)
AD-A170 756

* * *

TR-8304
A Model for the Processing of
Position Information in the Human
Visual System.
(AFOSR-TR-86-0540)
AD-A170 759

AD-A170 7 :

*CAMPBELL, ...EPHEN L.
* * *
Rank D... ...ent Least Squares and the N... ...al Solution of Linear Singul... ...olicit Systems of Differ... ...al Equations.
AD-A170 ...

*CARROLL, ... J
* * *
Data Tr... ...ormations in Regression Analys... ...th Applications to Stock - Recr... ...nt Relationships.
AD-A170 ...

*CARROLL, ...OND J.
* * *
A Note ... ...dapting for Hetero... ...sticity When the Varian... ...pend on the Mean.
AD-A168 ...
* * *
Estimat... ...eights in Hetero... ...stic Regression Models by App... ...Least Squares to Square... ...Absolute Residuals.
AD-A168 ...
* * *
M-Esti... ...n for Discrete Data: Asympt... ...Distribution Theory and Implic... ...s.
AD-A168 ...
* * *
Conditi... ...l Scores and Optimal Scores ... ...Generalized Linear Measur... ...t Error Models.
AD-A168 ...

*CHAN, KWAI S.
* * *
Study o... ...the Influence of Metallu... ...al Factors on Fatigue and Fra... ...e of Aerospace Structu... ...Materials.
AD-A170 ...

*CHANDRASE... ...N, B.
* * *
Distrib... ...d Knowledge Base Systems for Diagnosis and Information Retrieval.
AD-A170 830

*CHANG, CHIH
* * *
Spectroscopic Analysis of Poly(p-phenylene benzobisthiazole) Films.
AD-A168 610

*CHANG, WILLIAM S.
* * *
Research on Materials and Components for Opto-Electronic Signal Processing.
AD-A168 751

*CHAO, R.
* * *
Normalizing Transformations of Some Statistics of Gaussian ARMA processes.
AD-A170 184

*CHEN, X. R.
* * *
Almost Sure L(1)-Norm Convergence for Data-Based Histogram Density Estimates.
AD-A170 059

*CHENEY, MARGARET
* * *
A Rigorous Derivation of the Miracle Identity of Three-Dimensional Inverse Scattering.
AD-A170 166

*CHENG, C. S.
* * *
Optimal Step Type Designs for Comparing Test Treatments with a Control.
AD-A170 765

*CHENG, R. C.
* * *
Markov Algorithms for Computing the Reliability of Staged Networks.
AD-A170 275

*CHEO, BERNARD R.
* * *
Millimeter Wave Generation by Relativistic Electron Beams.
AD-A168 624

*CHIGIER, NORMAN
* * *
Large Eddy Structures in Transitional and Turbulent Flames.
AD-A170 150

*CHIOU, SHEN-NENG
* * *
Reliability Analysis of a Communication Network with Multimode Components.
AD-A169 488

*CHOI, C. S.
* * *
6,6,8-Trinitropentacyclo(5.3.0.02,5.03,9.04,8)decane, c10H3N306
AD-A169 988

*CHOI, CHANG S.
* * *
Structure of 6,6,10,10-Tetranitropentacyclo(5.3.0.0 superscript 2,5.0 superscript 3,9 0 superscript 4,8)decane, C10H8N408.
AD-A170 095

*CHU, SIU-KWONG
* * *
Approximate Evaluation of Reliability and Availability Via Perturbation Analysis.
AD-A168 561

*CHU, YEE-YEEN
* * *
Operator Alertness/Workload Assessment Using Stochastic Model-Based Analysis of Myoelectric Signals.
AD-A168 567
* * *
Operator Alertness/Workload Assessment Using Stochastic Model-Based Analysis of Myoelectric

Coordinat... Research Program in Pulsed P... Physics.
AD-A188 113

*SCONING, JA...

• • •

Measures ...pendence for Evaluatin ...formation in Censored Models.
AD-A170 881

*SELBY, RIC... W., JR

• • •

Evaluatic ...of Software Technolo... Testing, CLEANROOM, and Metri...
AD-A168 738

• • •

Experimen...ion in Software Engineeri...
AD-A170 840

*SELF, S. A.

• • •

Fundamenta... Processes in Partially Ionized P...s.
AD-A170 029

*SERFOZO, RI... F.

• • •

Heredity o... Stationary and Reversible ...tochastic Processes.
AD-A169 826

• • •

Extreme Va...s of Birth and Death Processes ... Queues.
AD-A168 632

• • •

Optimal I... and Inspection Periods for M/G/1 ...es.
AD-A170 110

*SETHURAMAN, ...RAN

• • •

Optimal Al...ation of Multistate Components
AD-A170 081

*SHAFIEE, FAT...

• • •

X-Ray Crys... Structure and Conformational Analysis of Tetradecamethylcycloheptasilane, (Me2Si),
AD-A170 866

*SHAKED, MOSHE

• • •

Inequalities for Propability Contents of Convex Sets via Geometric Average.
AD-A169 938

• • •

Ordering Distributions by Scaled Order Statistics.
AD-A169 940

• • •

Stochastic Convexity and Its Applications.
AD-A170 112

• • •

On the First Failure Time of Dependent Multicomponent Reliability Systems.
AD-A170 223

• • •

The Total Hazard Construction, Antithetic Variates and Simulation of Stochastic Systems.
AD-A170 285

• • •

The Multivariate Hazard Construction.
AD-A170 274

• • •

A Bayesian Approach to Quantile and Response Probability Estimation with Applications in Reliability.
AD-A170 455

*SHAN, T. J.

• • •

Adaptive Filtering Algorithms with Automatic Gain Control.
AD-A168 795

• • •

Multiple Signal Resolution with Uncertain Signal Subspace.
AD-A168 798

• • •

Adaptive Resolution of Overlapping Echoes.
AD-A169 020

• • •

A Time-Domain Signal Resolution Problem.
AD-A169 072

*SHAN, TIE-JUN

• • •

Adaptive Beamforming for Coherent Signals and Interference.
AD-A168 641

*SHANTHIKUMAR, J. G.

• • •

First Failure Time of Dependent Parallel Systems with Safety Periods.
AD-A168 526

• • •

On Stochastic Comparison of Random Vectors.
AD-A168 527

• • •

Bounds for the System Reliability Function.
AD-A168 528

• • •

DFR (Decreasing Failure Rate) Property of First Passage Times and Its Preservation under Geometric Compounding.
AD-A168 671

• • •

Analysis of Fault Tolerant Computer Systems.
AD-A170 004

• • •

A General Software Availability/Reliability Model: Numerical Exploration via the Matrix Laguerre Transform.
AD-A170 099

• • •

Stochastic Convexity and Its Applications.
AD-A170 112

• • •

On the First Failure Time of Dependent Multicomponent Reliability Systems.
AD-A170 223

ABSTRACTS

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-B102 441L 11/4 20/11

GRUMMAN A SPACE CORP BETHPAGE NY

(U) Micro mechanisms of Deformation in SiC/Al Composites.

DESCRIPTIVE NOTE: Interim rept. 1 Aug 84-31 Jul 85,

AUG 85 42P

PERSONAL AUTHORS: Papazian,J. M. ,Adler,P N ;

REPORT NO. RE-703

CONTRACT NO F49620-84-C-0055

PROJECT NO 2306

TASK NO. A1

MONITOR: AFOSR
TR 86-0289

UNCLASSIFIED REPORT
EXPORT CONTROL

Distribution limited to U.S. Gov't. agencies only; Test and Evaluation; 30 Apr 86. Other requests must be referred to *Air Force Office of Scientific Research*, Attn: XOTD, Building 410, Bolling AFB, DC 20332. This document contains export-controlled technical data.

ABSTRACT: (U) The micro-mechanisms of deformation of aluminum matrix composites containing SiC particles or whiskers are being evaluated in order to discover ways to improve their mechanical properties. A particular aspect of the deformation of these material that is being critically examined is the interaction between strengthening due to the SiC and strengthening due to the intermetallic precipitates formed by conventional age hardening practice. The first year's work has been occupied with obtaining materials, designing appropriate specimens and quantifying the effects of SiC on precipitation of the age hardening phases. Ten composite billets were purchased and extruded, they include 2124 and 5456 type matrix alloys, and various volume fractions of SiC particulate and whiskers. The effects of SiC on precipitation in 2124 were evaluated in a variety of conditions where quenching rate, aging practice, and SiC content were the primary variables. The precipitation sequence in the composites was found to be very similar to that of SiC free material. Additionally, the sequences were similar in SiC free 2124 prepared either by powder metallurgy, PM, or by ingot metallurgy. The quench sensitivity of 2124 was affected by the presence of SiC. Both SiC particulates and whiskers increased the quench sensativity of 2124 somewhat, mainly by causing the precipitation of GPB zones and S' during the quench. The most pronounced effect of SiC was found to be a decrease in the volume fracture of GPB zones formed.

DESCRIPTORS: (U) *AGE HARDENING, *DEFORMATION, *METAL MATRIX COMPOSITES, *SILICON CARBIDES, AGING(MATERIALS), ALLOYS, ALUMINUM, BILLETS, CASTINGS, *FRACTURE(MECHANICS)*, MATERIALS, MATRIX MATERIALS, MECHANICAL PROPERTIES, METALLURGY, PARTICLES, PHASE, POWDER METALLURGY, PRECIPITATION, QUENCHING, RATES, SEQUENCES, ALUMINUM ALLOYS, BILLETS(MATERIALS), WHISKER COMPOSITES, STRENGTH(MECHANICS), INTERMETALLIC COMPOUNDS

IDENTIFIERS: (U) Aluminum alloy 2124, Aluminum alloy 5456, EXPORT CONTROL, PE61102F, WUAFOSR2306A1

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A171 093 5/10 1/2

CALIFORNIA UNIV LOS ANGELES

(U) Measurement and Modification of Sensorimotor System Function Affecting Visual-Motor Performance.

DESCRIPTIVE NOTE: Annual rept. 30 Sep 84-29 Sep 85.

JUN 86 30P

PERSONAL AUTHORS: Sterman,M. B. ;Duchenko,T ;Hamel,A. S. ;

CONTRACT NO. AFOSR-82-0338

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR TR-86-0558

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives addressed during this phase of our work may be summarized as follows: 1) Complete initial study of sensorimotor and visual cortical EEG correlates of performance in an extended flight simulation task using band-pass analysis. Focus on intrinsic and imposed biological periodicities in these data; 2) Initiate second, more comprehensive study to provide greater resolution of EEG-performance correlates using power spectral analysis. Focus on problems of situational confusion and fatigue; and 3) Establish program at Edwards Air Force Base for in-flight testing of EEG recording techniques. Collect data for evaluation of EEG characteristics in relation to the dimensions of vigilance and drug induced changes in consciousness.

DESCRIPTORS: (U) *ELECTROENCEPHALOGRAPHY, *MOTOR REACTIONS, *NEUROPHYSIOLOGY, FLIGHT SIMULATION, VISUAL ACUITY, STRESS(PHYSIOLOGY), VIGILANCE, PASSENGERS, CONSCIOUSNESS, PILOTS, INFLIGHT, FATIGUE(PHYSIOLOGY), LIFE CYCLES, CEREBRAL CORTEX, WORKLOAD

IDENTIFIERS: (U) T-38 aircraft, PE61102F, WUAFOSR2313A4

AD-A171 093

AD-A171 078 8/2 9/2

NEW YORK UNIV N Y

(U) The Perception of the Higher Derivatives of Visual Motion.

DESCRIPTIVE NOTE: Final scientific rept. 1 Jan 82-31 Sep 85.

JUN 86 85P

PERSONAL AUTHORS: Kaufman,Lloyd ;Williamson,Samuel J. ;

CONTRACT NO. AFOSR-82-0050

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR TR-86-0515

UNCLASSIFIED REPORT

ABSTRACT: (U) Sensitivity to changing speed was studied with gratings of various spatial frequencies drifting across a screen while the average velocity was modulated. Thresholds expressed either as the velocity amplitude (difference between peak and average velocities) or as the maximum acceleration, increased monotonically with average velocity. The threshold for velocity contrast (velocity amplitude divided by average velocity) actually decreassd with average velocity. The velocity contrast was minimal for velocity modulation frequencies of about 2 Hz and for spatial frequencies in the range of 2-4.5 c/d. In addition to these basic findings, we failed to find any effect of selective adaptation to changing speed other than that could be attributed to smooth motion. It seems unlikely that mechanisms tuned to respond to changing speed per se are present in the human perceptual system. However, it is not possible to generalize from this to situations where higher derivatives are introduced by causing stimuli to change direction of motion. (Author)

DESCRIPTORS: (U) *VISUAL PERCEPTION, *COMPUTER OPERATORS, *VELOCITY, MOTION, SENSITIVITY, ACCELERATION, AMPLITUDE MODULATION, CHARTS

AD-A171 078

AD-A171 078 CONTINUED

IDENTIFIERS. (U) Visual motion, PE61102F, WUAFOSR2313A5

AD-A171 081 7/5 7/4

PITTSBURGH UNIV PA DEPT OF CHEMISTRY

(U) Spectroscopic Studies of the Products of the Reactions of Electronically Excited Atoms and Small Molecules.

DESCRIPTIVE NOTE: Final rept. 15 Apr 83-14 Apr 86,

JUN 86 33P

PERSONAL AUTHORS: Golde,Michael F. ;

CONTRACT NO. AFOSR-83-0188

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-88-0514

UNCLASSIFIED REPORT

ABSTRACT: (U) The rate constants and products of the reactions of electronically excited Ar, Kr, and Xe atoms and N2(A 3 Sigma(+) sub u) and CO(a 3Pi) molecules with several oxygen, hydrogen and chlorine containing compounds have been determined, using emission spectroscopy, atomic resonance fluorescence and laser induced fluorescence measurements in discharge flow systems. As found previously for the excited noble gases, there is a strong correlation between the rate constants for quenching of N2(A) and the availability of accessible acceptor states of the quenching molecule, as revealed by its absorption spectrum. Consistent with this correlation, the rate constants for several inefficient quenchers are greatly enhanced reactions with vibrationally-excited N2(A). Energy transfer leading to molecular dissociation is the dominant mechanism, when energetically allowed, for most reactions of N2(A) studied. Similar behavior is shown by both efficient and inefficient quenchers, and the results parallel the UV photochemistry of these molecules. In contrast to N2(A), the isoenergetic CO(a 3 Pi) species if quenched very efficiently by H2O, CH4 and H2. The reaction products have been investigated in an attempt to gain insight into this difference in behavior.

DESCRIPTORS: (U) *LASER INDUCED FLUORESCENCE, *RESONANCE RADIATION, *REACTION KINETICS, RARE GASES, NITROGEN,

AD A171 061 CONTINUED

...ITATION, ENE... TRANSFER, GAS DISCHARGES, EMISSION ...CTROSCOPY, G... ING(INHIBITION), MOLECULAR VIBRATION, ...ROGEN, WATER ...R, METHANE, HYDROGEN

IDENTIFIERS: (U) PE61102F, WUAFOSR2303G1

AD-A171 029 17/10

COOPERATIVE INST FOR RESEARCH IN ENVIRONMENTAL SCIENCE BOULDER CO

(U) Deterministic Methods of Seismic Source Identification.

DESCRIPTIVE NOTE: Annual technical rept. 30 Sep 83-1 Oct 84,

NOV 84 144P

PERSONAL AUTHORS: Archambeau,Charles B. ;

CONTRACT NO. F49620-83-C-0009, ARPA Order-4689

PROJECT NO. 2309

TASK NO A2

MONITOR: AFOSR TR-86-0506

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives were to: (1) Develop and test methods of discrimination in the regional and teleseismic distance range using physical source parameter discriminants, Pursue theoretical and observational studies of seismic sources; (3) develop methods of theoretical seismogram synthesis in the near, regional and teleseismic distance ranges for structure and source definition; (4) Develop and apply advanced signal processing/analysis methods for discrimination and explosion yields estimation studies and; (5) Pursue near field studies of explosions and earthquakes for detailed source definition. This report describes specific research results pertaining to: (1) The theoretical basis for automatic seismic signal detection and analysis, and (2) Analytical methods for the representation of seismic radiation fields in uniformly layered elastic/anelastic media. This modal method provides predictions of both body and surface waves in the frequency range from 0 to about 15 HZ t near and regional distances from seismic sources. Thi latter exposition is intended to be comprehensive and integrates new and old results and methods. The modal representation method for seismic radiation fields is being employed to describe radiation fields for the prediction of earthquake and explosion radiation fields and has been used to evaluate a variety

AD-A171 028 CONTINUED

of detectio and discrimination methods.

DESCRIPTORS: (U) *DISCRIMINATION, *SEISMIC SIGNATURES, UNDERGROUN LOSIONS, EARTHQUAKES, SEISMOLOGY, SEISMIC DETECTION, IER ANALYSIS, TIME SERIES ANALYSIS

IDENTIFIERS: (U) Seismic discrimination, QHD(Quasiha ic Decomposition), WUAFOSR2309A2, PE61102F

AD-A171 027 12/2

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF APPLIED MATHEMATICS AND STATISTICS

(U) On the Maintenance of Systems Composed of Highly Reliable Components.

DESCRIPTIVE NOTE. Research rept. Jul 84-Sep 85,

SEP 85 18P

PERSONAL AUTHORS: Katehakis,Micfhael N. ;Derman,Cyrus ;

REPORT NO. AMS-85-57

CONTRACT NO. AFOSR-84-0138, NSF-DMS84-05413

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0520

UNCLASSIFIED REPORT

ABSTRACT: (U) We consider the dynamic repair allocation problem for a general multi-component system that is maintained by a limited number of repairmen. Component functioning and repair times are assumed to be exponentially distributed with parameters that may depend on the component but not on repairmen. At most one repairman may be assigned to a failed component. The objective is to determine repair allocation policies that maximize a measure of performance for the system such as the expected discounted system operation time or the availability of the system. We consider systems composed of highly reliable i.e., small failure rates, components and study asymptotic techniques for the determination of optimal policies. In the final section we find asymptotically optimal policies for the series, parallel and a system composed of parallel subsystems connected in series. (Author)

DESCRIPTORS: (U) *MAINTENANCE, *SYSTEMS MANAGEMENT, *APPLIED MATHEMATICS, REPAIR, ASYMPTOTIC NORMALITY, OPTIMIZATION, RELIABILITY, DYNAMIC PROGRAMMING

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A171 018 9/3

TEXAS A M UNIV COLLEGE STATION

(U) On Nearabilities in Asymptotic Memoryless Detection.

MAR 86 6P

PERSONAL AUTHORS: Halverson,Don R. ;Wise,Gary L. ;

CONTRACT NO. AFOSR 82-0033, AFOSR-81-0047

PROJECT NO. 2304

TASK NO.

MONITOR: AFOSR
TR-86-0437

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in IEEE Transactions on Information Theory, vIT-32 n2 p292-298 Mar 86

ABSTRACT: The discrete time detection of a constant signal in corrupting noise is considered. First the case where the noise is independent and identically distributed is considered, and the criterion of asymptotic relative efficiency is employed to investigate the effect on the detector's performance induced by altering the form of the detector nonlinearity from that of the locally optimal nonlinearity. The results show that the resultant degradation in performance can be bounded in terms of the L2 distance between the locally optimal nonlinearity y of interest. We then extend our results to the case of weakly dependent phi-mixing noise and see that in particular, asymptotic relative efficiency can be viewed as a mapping between metric spaces that is continuous at the point of interest.

DESCRIPTORS: (U) *SIGNAL PROCESSING, *NOISE REDUCTION, EFFICIENCY, ASYMPTOTIC NORMALITY, DISCRETE DISTRIBUTION, DETECTORS, BAYES THEOREM

IDENTIFIERS: (U) *Memoryless detection, Neyman Pearson Decision Theory, PE61102F, WUAFOSR2304A5

AD-A171 002 14/2 20/3

MINNESOTA UNIV ST PAUL

(U) Variable Temperature Superconducting Magnetometer/ Susceptometer.

DESCRIPTIVE NOTE: Final rept. 1 Jan-31 Dec 85,

MAR 86 12P

PERSONAL AUTHORS: Dahlberg,E. D. ;Muenck,Eckard ,Goldman, Allen M. ;Weyhmann,Walter ;

CONTRACT NO. AFOSR-85-0047

PROJECT NO. 2917

TASK NO. A3

MONITOR: AFOSR
TR-86-0528

UNCLASSIFIED REPORT

ABSTRACT: (U) A variable temperature superconducting susceptometer has been acquired for the measurement of magnetic moments and susceptibilities of small samples over a wide range of temperature and magnetic field. This instrument is equipped for measurement over the temperature range from 1.8K up to 400K, and in magnetic fields up to 8 Tesla. The system operates under full computer control of all of its parameters utilizing a software package which runs on a Hewlett Packard Touch Screen II Computer. The instrument will be shortly retrofitted with a second SQUID Probe configured to permit measurements of components of the magnetization and susceptibility transverse to the axis of the instrument as well as to rotate samples about the axis of the superconducting solenoid.

DESCRIPTORS: (U) *MAGNETOMETERS, *ELECTROMAGNETIC SUSCEPTIBILITY, *SUPERCONDUCTORS, MAGNETIC MOMENTS, MAGNETIC FIELDS, TEMPERATURE COEFFICIENTS, QUANTUM ELECTRONICS, RESEARCH MANAGEMENT, COMPUTER APPLICATIONS, CONTROL SYSTEMS

IDENTIFIERS: (U) SQUID(Superconducting Quantum Interference Devices), PE61102F, WUAFOSR2917A3

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 [illegible]4 20/8

COLOR / UNIV AT BOULDER

(U) La[illegible] Diagnostics for Plasma Turbulence Research.

DESCRIPT[illegible]E NOTE: Final rept. 1 Jan-31 Dec 85.

MAR [illegible] 4P

PERSONAL [illegible]THORS: Robertson,Scott ;Stern,Raul ;

CONTRACT [illegible]) AFOSR-85-0069

PROJECT [illegible] 2301

TASK NO A7

MONITOR AFOSR
TR-86-0428

UNCLASSIFIED REPORT

ABSTRACT (U) A tunable scanning dye laser pumped by an argon [illegible] laser (Coherent Models 699-21 and INNOVA-12UV, respe[illegible]ely) has been installed for use as a diagnostic in e[illegible]ments on ion beams and plasma turbulence. The laser [illegible]ed acceptance tests in October 1985. Initial use i[illegible] a new experiment to determine the atomic proce[illegible]s in negative hydrogen ion sources. This project, entit[illegible] Modern Diagnostics of Negative Hydrogen Plasmas, [illegible] is s[illegible]orted by a NATO grant. (Author)

DESCRIP[illegible]S (U) *TUNABLE LASERS, *DYE LAYERS, *PLASMA DIAG[illegible]IC, ARGON LASER, LASER PUMPING, ION BEAMS, TURBU[illegible]E

IDENTIFI[illegible]RS (U) PE61102F, WUAFOSR2301A7

AD-A170 [illegible]4

AD-A170 975 7/3

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Polysilane High Polymers with Olefinic Side Groups: Syntheses, Properties, and Addition of Hydrogen Halides.

DEC 85 5P

PERSONAL AUTHORS: Stueger,Harald ;West,Robert ;

CONTRACT NO. F49620-83-C-0044

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-86-0589

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Macromolecules, v18 n12 p2349-2352 Dec 85.

ABSTRACT: (U) Three polysilane polymers containing alkene substituent groups were prepared by sodium condensation dichlorosilanes: poly((2-(3-cyclohexenyl) ethyl)methylsilylene) (3) and copolymers of this with phenylmethylsilylene (1) and n-propylmethylsilylene units (2). These polymers undergo cross-linking when irradiated with UV light or heated to 200 C in vacuo. Addition of HCl or HBr to 1 or 2 in the presence of Lewis acid catalysts gave the corresponding chlorine-or bromine-containing polymers, with little degradation of the polysilane backbone.

DESCRIPTORS: (U) *SILANES, *POLYMERS, *SYNTHESIS(CHEMISTRY), *ADDITION REACTIONS, SODIUM, CONDENSATION, CHLOROSILANES, CROSSLINKING(CHEMISTRY), HYDROGEN CHLORIDE, HYDROGEN COMPOUNDS, BROMIDES, ULTRAVIOLET RADIATION, MACROMOLECULES, REPRINTS

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F

AD-A170 975

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 972 7/5 7/3

AD-A170 972 CONTINUED

WISCONSIN UN[- MADISON DEPT OF CHEMISTRY

WUAFOSR230382, PE61102F

(U) IR Transi[n Moment Directions in Matrix-Isolated Dimethyls[ylene and 1-Methylsilene.

86 9P

PERSONAL AUTH[> Ri abe,Gerhard ;Vancik,H. ;West,Robert ; Michl,Josef .

CONTRACT NO. F49620-83-C-0044

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFO[R TR[0586

UNCLASSIFIED REPORT

SUPPLEMENTARY [TE: Pub. in Jnl. of The American Chemical Society, v108 n4 p671-677 1986.

ABSTRACT: (U) Irradiation of matrix-isolated dimethyldiaz[silane yields dimethylsilylene(1) as the major produc[Photoselection on the 450 nm absorption band of 1 wi[polarized 488-nm light, which converts 1 into 1-methy[ilene(2), permitted the assignment of six IR transitio[of 1 and twelve IR transitions of 2 as in-plane or out[plane polarized. Photoselection on the 280-nm abso[n band of 2 with polarized 248-nm light, which conve[2 back into 1 allowed a determination of the absolute[alues of polarization angles of seven in-plan polariz[IR transitions of 2 relztive to the pi pi* transition [t. The resulting map of the IR transition moment dire[s in the molecule of 1 provides strong support for [detailed assignment of the nature of the vibrational [ions involved. Along with other data, the results lea[very little doubt as to the correctness of the structur[and vibrational assignments in 1 and 2.

DESCRIPTORS: (U) *SILANES, *METHYL RADICALS, *PHOTOCHEMI[REACTIONS, IRRADIATION, ELECTRON TRANSITIONS [ORPTION SPECTRA, POLARIZATION, VIBRATION, MOMENTS, MO[AR STRUCTURE, DICHROISM, REPRINTS

IDENTIFIERS: (U) Silylene/Dim thyl, Silene/1-Methyl,

AD-A170 972

AD-A170 972

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 971 20/12 20/3

BROWN UNI. PROVIDENCE RI DIV OF ENGINEERING

(U) Picos d Nonlinear Resonant Interactions in Semic ductors.

DESCRIPTIVE NOTE: Interim rept. no. 1 (Annual), 1 Jan-31 Dec 82,

MAR 88 13P

PERSONAL AUTHORS: Nurmikko,Arto V. ;

PROJECT NO 2306

TASK NO. C2

MONITOR: AFOSR TR 88-0528

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was aimed at advancing understa ng and utilization of selected optical properti s of semiconductors containing magnetic elements. Emphasis as placed on the interaction of such materials with ult ort pulses of laser radiation in order to study c d electronic and magnetic excitations under selected equilibrium conditions. We hoped to generate novel re ts throug experimental research for applicat s to fast optoelectronic devices. The mixed crystal s iconductors (Cd, Mn)Se and (Cd, Mn)Te were used. The ontract work as generated a number of 'firsts e.g. we measured the formation of local, microsc magnetically oriented 'domains' through real-time spe roscopy with picosecond laser pulses. (Author)

DESCRIPTOR (U) *SEMICONDUCTORS, *MAGNETIC MATERIALS, *BAND T OF SOLIDS, *MAGNETIC DOMAINS, CADMIUM COMPOUN MANGANESE COMPOUNDS, SELENIDES, TELLURIDES, EXCITONS TEMPERATURE, SPECTROSCOPY, PHOTONS

IDENTIFIER (U) Magnetic excitations, BMP(Bound Magneti Polaron), Cadmium manganese selenide, Cadmium manganese telluride, WUAFOSR2306C2, PE61102F

AD-A170 971

AD-A170 970 20/12 20/3 20/5

MICHIGAN UNIV ANN ARBOR COASTAL ZONE LAB

(U) Picosecond Nonlinear Resonant Interactions in Semiconductors.

DESCRIPTIVE NOTE: Interim rept. no. 2 (Annual) 1 Jan-31 Dec 83,

MAR 88 13P

PERSONAL AUTHORS: Nurmikko,Arto V. ;

CONTRACT NO. F49620-82-C-0044

PROJECT NO. 2306

TASK NO. C2

MONITOR: AFOSR TR-88-0524

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was aimed at advancing understanding and utilization of selected optical properties of semiconductors containing magnetic elements. Emphasis was placed on the interaction of such materials with ultrashort pulses of laser radiation in order to study coupled electronic and netic excitations under selected nonequilibrium conditions. We hope to generate novel results through experimental research for applications to fast optoelectronic devices. The mixed crystal semiconductors (Cd, Mn)Se and (Cd, Mn)Te were used. The contract work has generated a number of 'firsts', e.g. we measured the formation of local, microscopic magnetically oriented 'domains' through real-time spectroscopy with picosecond laser pulses. (Author)

DESCRIPTORS: (U) *SEMICONDUCTORS, *MAGNETIC DOMAINS, *GROUP II-VI COMPOUNDS, *PULSED LASERS, *MAGNETIC RESONANCE, CADMIUM COMPOUNDS, MANGANESE COMPOUNDS, NONLINEAR SYSTEMS, SELENIDES, TELLURIDES, LIGHT PULSES, SPECTROSCOPY, MAGNETOOPTICS, IONS, COUPLING(INTERACTION), REAL TIME, EXCITONS

IDENTIFIERS: (U) Resonant interactions, Cadmium manganese selenide, Cadmium manganese telluride, Magnetic excitations, T-2 relaxation time, BMP(Bound Magnetic

AD-A170 970

AD-A170 970 CONTINUED

Polarons), ...gnetic polarons, Polarons, WUAFOSR2306C2, PE61102F

AD-A170 944 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Semigroups and Poisson - Approximation.

DESCRIPTIVE NOTE: Technical rept. no. 132, Sep 85-Aug 86,

DEC 85 13P

PERSONAL AUTHORS: Deheuvels,P. ;Pfeifer,D. ;

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0339

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: (U) This paper extends previous work of the authors on Poisson approximation for (general) independent Bernoulli summands with respect to the total variation distance, without imposing any conditions on the underlying parameters. This enables one to study also the case of unbounded means, without asymptotic uniform smallness of the individual summands, provided that the variance increases with the same rate as the mean. An important practical situation in which such an asymptotic behaviour occurs is described by Ross's Markov chain model for the Simplex Algorithm in linear programming, which will be discussed as an example of possible application. (Author)

DESCRIPTORS: (U) *GROUPS(MATHEMATICS), *APPROXIMATION(MATHEMATICS), RANDOM VARIABLES, ALGORITHMS, ASYMPTOTIC NORMALITY, LINEAR PROGRAMMING, STOCHASTIC PROCESSES

IDENTIFIERS: (U) *Semigroups(Mathematics), Simplex method, PE61102F, WUAFOSR2304A5

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 935 14/2 9/2

DREXEL U... PHILADELPHIA PA DEPT OF ELECTRICAL AND COMPUTER ...GINEERING.

(U) Compu... Facilities for High-Speed Data Acquisition, Signal Processing and Large Scale System Simulation.

DESCRIPTIVE NOTE. Final rept. 15 Dec 84-14 Apr 86

JUN 86 28P

PERSONAL A... RS: Bilgutay,Nihat M. ;

CONTRACT Nu... AFOSR-85-0056

PROJECT NO 2917

TASK NO. ...3

MONITOR: AFOSR
... 86-0507

UNCLASSIFIED REPORT

ABSTRACT: (U) This equipment grant was issued under the DOD Unive...sity Research Instrumentation Program for the purpose o... upgrading the research instrumentation at Drexel U... versity, Electrical and Computer Engineering Departme... in order to improve the exiting facilities to better s... port present and future research having relevance ... the National Defense Goals. In accordance with the ...idelines of the grant, the funds have been expended ... fulfill the stated goals of the grant.

DESCRIPTORS (U) *MILITARY RESEARCH, *INSTRUMENTATION, *DIGITAL ...MPUTERS, GRANTS, RESEARCH FACILITIES, ELECTRICAL ENGINEERING, COMMUNICATIONS NETWORKS

IDENTIFIERS (U) Funding, VAX 11/780 computers, Ethernet, MUAFOSR2...A3, PE61102F

AD-A170 935

AD-A170 823 7/4

BRISTOL UNIV (ENGLAND) DEPT OF INORGANIC CHEMISTRY

(U) Compounds Containing Heteronuclear Metal-Metal Bonds.

DESCRIPTIVE NOTE: Final rept. 1 Mar 82-28 Feb 86.

MAR 86 24P

PERSONAL AUTHORS: Stone,F. G. ;

CONTRACT NO. AFOSR-82-0070

PROJECT NO. 2302

TASK NO. B2

MONITOR: AFOSR
TR-86-0510

UNCLASSIFIED REPORT

ABSTRACT: (U) This Report describes the synthesis and structural characterisation of several gold-ruthenium cluster compounds, as well as the discovery of the first trimetallic complexes containing the hexanuclear core structures MM'Ru4 (M = Ag, M' = Cu; M = Au, M' =Cu; M = Au, M' = Ag). Using variable temperature 31P-1H nuclear magnetic resonance spectroscopy we have observed polytopal rearrangements of these clusters in solution. Also described are new heteronuclear cluster compounds containing bonds between iridium and osmium or platinum. In a further study the first mixed-metal clusters involving osmium and platinum with interstitial carbido ligands are reported. Rational synthetic routes have been developed for preparing cluster compounds containing chains and rings of metal atoms in which the metal-metal bonds are bridged by alkylidyne groups. This work has led to the characterisation, via X-ray diffraction and n.m.r. studies, of novel compounds with core structures having eight metal atoms (Pt4W4 or Ni2Pt2W4) in a ring in the shape of a 'star'.

DESCRIPTORS: (U) *SYNTHESIS(CHEMISTRY), *ANALYTICAL CHEMISTRY, *METAL COMPLEXES, *METAL METAL BONDS, HETEROCYCLIC COMPOUNDS, GOLD, RUTHENIUM, CLUSTERING, TERNARY COMPOUNDS, NUCLEAR MAGNETIC RESONANCE, SPECTROSCOPY, CHEMICAL BONDS, IRIDIUM, OSMIUM, PLATINUM, POLYCYCLIC COMPOUNDS, MOLECULAR STRUCTURE, LIGANDS

AD-A170 923

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 923 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2302B2

AD-A170 915 9/2

DUKE UNIV DURHAM NC DEPT OF COMPUTER SCIENCE

(U) A Single Server Queue in a Hard-Real-Time Environment,

DEC 85 9P

PERSONAL AUTHORS: Baccelli,Francois ;Trivedi,Kishor S. ;

CONTRACT NO. AFOSR-84-0132, NSF-MCS83-0200

PROJECT NO. 2304

TASK NO. K3

MONITOR: AFOSR
TR-86-0594

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Operations Research Letters, v4 n4 p161-168 Dec 85.

ABSTRACT: (U) We consider a single server first in first out queue in which each arriving task has to be completed within a certain period of time(its deadline). More precisely, each arriving task has its own deadline - a non-negative real number - and as soon as the response time of one task exceeds its deadline, the whole system in considered to have failed. (In that sense the deadline is hard). The main practical motivation for analyzing such queues comes from the need to evaluate mathematically the reliability of computer systems working with real time constraints (space or aircraft systems for instance). We shall therefore be mainly concerned with the analytical characterization of the transient behavior of such a queue in order to determine the probability of meeting all hard deadlines during a finite period of time (the 'mission time'). The probabilistic methods for analyzing such systems are suggested by earlier work on impatience in telecommunications systems. (Author)

DESCRIPTORS: (U) *QUEUEING THEORY, *DOWNTIME, REAL TIME, MATHEMATICAL MODELS, NUMERICAL ANALYSIS, SYSTEMS ANALYSIS, REPRINTS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304K3

AD-A170 915

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 905 20/7 10/2

CORNELL UNIV ITHACA NY LAB OF PLASMA STUDIES

(U) Interim Scientific Report for the Induction Linac Program

DESCRIPTIVE NOTE: Annual rept. 1 Oct 83-30 Sep 84,

SEP 84 23P

PERSONAL AUTHORS: Nation,John A. ;

CONTRACT NO AFOSR-83-0364

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR TR-86-0546

UNCLASSIFIED REPORT

ABSTRACT: (U) The induction Linac program has been carried out principally using a dedicated Blumlein facility as the pulse power source. As previously described the source feeds a two to one step up autotransformer, which when coupled with a direct electrostatic feed to the anode from the Blumlein, gives a diode voltage of three times the line output voltage. The nominal operating impedance of the system is 21 Ohms. This system has continued to work well during the current grant period. (Author)

DESCRIPTORS: (U) *LINEAR ACCELERATORS, *PROTON ACCELERATORS, *PULSE GENERATORS, POWER SUPPLIES, ELECTRICAL IMPEDANCE, PROTON BEAMS, TRANSIENTS, FERRITES, INDUCTANCE, IONS, DIODES, WAVEFORMS

IDENTIFIERS (U) Blumlein facilities, Autotransformers, Ferrite cores, Beam diagnostics, Injectors, Faraday cups, Charge neutralization, Intense beams, PE61102F, WUAFOSR2301A7

AD-A170 869 7/3

SAN DIEGO STATE UNIV CA DEPT OF CHEMISTRY

(U) Kinetic and Product Studies of the Thermal Decomposition of Dimethylsilane in a Single-Pulse Shock Tube and in a Stirred Flow Reactor.

86 9P

PERSONAL AUTHORS: Rickborn,S. F. ;Rogers,D. S. ;Ring,M. A. ;O'Neal,H. E. ;

CONTRACT NO. AFOSR-83-0209

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-86-0591

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v90 n3 p408-414 1986.

ABSTRACT: (U) The kinetic and product studies of the pyrolysis of dimethylsilane in a single-pulse shock tube (1135-1280 K) and in a stirred flow reactor (890-1000 K) are reported. The shock-induced reaction is accelerated by free-radical and silylene chains which cannot be quenched by trapping agents. The mechanisms of the pyrolysis in various temperature ranges are discussed and modeling results for the stirred flow and shock tube reactions are shown to be in reasonable agreement with experimental observations. Mechanisms for the decomposition of dimethylsilylene to ethylene and acetylene via silacyclopropane and silacyclopropene intermediates, respectively, are proposed. Arrhenius parameters for molecular elimination of methane from dimethylsilane are reduced, establishing an activation energy for Ch3SiH insertion into the (C-H) bond of methane of E similar to 24.8 kcal (pressure standard state).

DESCRIPTORS: (U) *SILANES, PYROLYSIS, REACTION KINETICS, SHOCK TUBES, MODELS, REPRINTS

IDENTIFIERS: (U) *Dimethylsilane, *Dimethylsilylene,

AD-A170 869

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 869 CONTINUED

Silylenes, WUAFOSR230382 PE61102F

AD-A170 868 9/1 20/12

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCES

(U) Computation of Output Electron Distributions in Avalanche Photodiodes,

JUL 84 5P

PERSONAL AUTHORS: Helstrom,Carl W. ;

CONTRACT NO. AFOSR-82-0343

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-84-1158

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Electron Devices, vED-31 n7 p955-958 Jul 84.

ABSTRACT: (U) The cumulative probability distribution of the number of electrons counted during an interval (0,T) at the output of an avalanche photodiode is calculated from Personick's and McIntyre's model by numerical contour integration in there complex plane, a method that yields accurate results with a number of operations roughly independent of the numbers of electrons involved. The incident light is assumed for the sake of illustration to produce electrons with a Poisson distribution. (Author)

DESCRIPTORS: (U) *PHOTODIODES, *AVALANCHE DIODES, *SEMICONDUCTORS, PAIR PRODUCTION, INTEGRATION, ELECTRONS, ENERGY, REPRINTS, MONTE CARLO METHOD, VOLTAGE

IDENTIFIERS: (U) Personick's model, Poisson distribution, Approximation, Photosensitive diodes, McIntyre's model, WUAFOSR2304A5, PE61102F

AD-A170 869

AD-A170 868

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVNJ4M

AD-A170 [illegible] 7/3

WISCON[illegible]N UNIV-MADISON DEPT OF CHEMISTRY

(U) X-R[illegible] Crystal Structure and Conformational Analysis of Tet[illegible]camethylcycloheptasilane, (Me2Si).

85 8P

PERSONAL [illegible]THORS: Shafiee,Fathieh ;Damewood,James R. , Jr. ;Haller Kenneth J. ;West,Robert ;

CONTRACT NO F49620-83-C-0044

PROJECT NO 2303

TASK NO. B2

MONITOR: AFOSR TR-86-0583

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of American Chemical Society, v107 n24 p6950-6956 1985.

ABSTRACT: (U) The crystal and molecular structure of tetrad[illegible]ethylcycloheptasilane (1) has been determined. Molecul[illegible] of 1 are of approximate C2 symmetry and adopt a twist-ch[illegible]air conformation. Empirical force field (EFF) calculations indicate that while cycloheptane and 1 adopt similar twist-chair ground-state structures, these molecules show significant differences in the structures of other possible conformations (chair, twist boat, and boat) and the barriers to their interconversion. The average Si Si angle in 1 (118.2) is larger than that found for other cyclosilanes.

DESCRIPTORS: (U) *SILANES, *CYCLIC COMPOUNDS, CRYSTAL STRUCTU[illegible] X RAY DIFFRACTION, MOLECULAR STRUCTURE, METHYL RADICALS, REPRINTS

IDENTIFIERS: (U) Silane/Tetradecamethylcyclohepta, WUAFOSR[illegible]82, PE61102F

AD-A170 884

7/4

VANDERBILT UNIV NASHVILLE TN DEPT OF CHEMISTRY

(U) The Calculation of Infrared Intensities.

NOV 85 3P

PERSONAL AUTHORS: Schaad,L. J. ;Ewig,C. S. ;Hess,B. A. , Jr.;Michalska,D. ;

CONTRACT NO. AFOSR-82-0100, AFOSR-85-0072

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-86-0332

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v83 n10 p5348-5349, 15 Nov 85.

ABSTRACT: (U) We show a new method for computing relative intensities of infrared spectral lines employing ab initio quantum calculations. It constructs an approximately uniform electric field relying on appropriately placed point charges. Examples are presented using the infrared spectrum of ethylene computed in two basis sets both by the present method and by earlier methods. These are compared with experimental spectra. The two theoretical methods give essentially identical results, and those in the larger basis give good agreement with experiment.

DESCRIPTORS: (U) *INFRARED SPECTRA, *SPECTRAL LINES, COMPUTATIONS, ELECTRIC FIELDS, DIPOLE MOMENTS, ETHYLENE, REPRINTS

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 862 6/20 F/5

EIDGENOES THE TECHNISCHE HOCHSCHULE AND ZURICH UNIV SCHWERZE. (SWITZERLAND) INST OF TOXICOLOGY

(U) Correl n of Mutagenic, Carcinogenic and Cocarc enic Effects of Chemical Substances. Granul Pouch Assay.

DESCRIPTIVE IE: Final rept. 1 Sep 82-31 Aug 85.

OCT 85 18P

PERSONAL AUT (S): Zbinden,Gerhard ;Maier,Peter ;

CONTRACT NO. AFOSR-82-0338

PROJECT NO. 2312

TASK NO. A

MONITOR: A SR
T 88-0571

UNCLASSIFIED REPORT

ABSTRACT: (U) The research project is concerned with the detection premalignant and malignant cells induced in vivo in a el assay system the granuloma pouch assay. Cells exp to carcinogens in vivo can be studied for DNA dama chromosomal aberrations, specific locus mutations cell transformations. Various assays were developed investigate the growth characteristics of normal, c inogen-exposed and transformed granuloma pouch cell. These included: primary cloning efficiencies under opti growth conditions, growth in serum deficient calcium depleted media, growth in soft agar, growth in mic mice and rats, growth with cocultured normal cel, growth under influence of growth factors. Phenotypic alterations investigated were the DNA-dispersion individual cells and the appearance of calcium b g proteins. Furthermore the genotoxic/cytotoxic tivity of asbestos fibers was investigated.

DESCRIPTORS: (U) *MUTAGENS, *CARCINOGENS, *GRANULOMA, CELLS(BIOL), ENDOTHELIUM, FIBROBLASTS, NEOPLASMS, CARCINOG S, BIOASSAY, IN VIVO ANALYSIS, CELL DIVISION, CLONES, C ES(BIOLOGY), DEOXYRIBONUCLEIC ACIDS, PROTEINS, C CIUM, ASBESTOS, FIBERS, TOXICITY

AD-A170 862

AD-A170 862

AD-A170 862 CONTINUED

IDENTIFIERS: (U) WUAFOSR2312A5, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 860 20/12 20/3 AD-A170 860 CONTINUED

BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING PE61102F

(U) Picosec[ond] Nonlinear Resonant Interactions in Semicon[ductors].

DESCRIPTIVE N[OTES]: E[inal] Annual rept. no. 4, 1 Jan-31 Dec 85,

MAR 88 28P

PERSONAL AUTH[OR]S: Nurmikko,Arto V. ;

CONTRACT NO. F49620-82-C-0044

PROJECT NO. 2308

TASK NO. C2

MONITOR: AF[OSR]
TR-88-0529

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was aimed at advancing understand[ing] and utilization of selected optical properties [of] semiconductors containing magnetic elements. Emphasis w[as] placed on the interaction of such materials with ultra[short] pulses of laser radiation in order to study coupl[ed] electronic and magnetic excitations under selected n[on]-equilibrium conditions. We hoped to generate novel resu[lts] through experimental research for applicatio[ns] to fast optoelectronic devices. The mixed crystal se[mi]conductors (Cd, Mn)Se and (Cd, Mn)Te were used. The c[on]tract work has generated a number of 'firsts, e.g. we m[eas]ured the formation of local, microscopic magnetical[ly] oriented 'domains' through real-time spectrosco[py] with picosecond laser pulses. (Author)

DESCRIPTORS: (U) *SEMICONDUCTORS, *BAND THEORY OF SOLIDS, *RECOMBINA[TION] REACTIONS, *MAGNETIC DOMAINS, PULSED LASERS, CA[DMIUM] COMPOUNDS, LEAD COMPOUNDS, MANGANESE COMPOUNDS, [EUR]OPIUM COMPOUNDS, TELLURIDES, MAGNETIC MOMENTS, S[ELEN]IDES, ELECTROOPTICS, INFRARED RADIATION

IDENTIFIERS: (U) Lead europium telluride, Barium fluorides, Cadmium manganese selenide, Semimagnetic semiconduct[or]s, Spin, Cadmium manganese telluride, Superlatti[ce]s, Optoelectronics, Resonant interactions, F shell, Bloch states, Magnetooptics, WUAFOSR2306C2.

AD-A170 860 AD-A170 860

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 859 7/4

LA JOLLA INST CA

(U) Low-Energy Collisions of Excited Atoms.

DESCRIPTIVE NOTE: Final rept. 1 May 85-30 Apr 88,

MAY 88 5P

PERSONAL AUTHORS: Neynaber,Roy H. ;Tang,Sheng Y. ;

CONTRACT NO. F49620-85-C-0070

PROJECT NO. 2301

TASK NO. A4

MONITOR: AFOSR TR-88-0519

UNCLASSIFIED REPORT

ABSTRACT: (U) The report describes molecular beam studies of ion pair production, chemionization, and measurements of the fraction of excited Na atoms in a composite beam of gas of ground state and excited Na atoms. Some of the experiments involved laser excited Na as a reactant. Included are investigations of excited Na-Na, Na-Cl, metastable He-Li, Li-Cs, and Li-excited Na systems.

DESCRIPTORS: (U) *ATOMIC BEAMS, *PAIR PRODUCTION, *IONIZATION, CHARGE TRANSFER, EXCHANGE REACTIONS, CROSS SECTIONS, LASER PUMPING, SODIUM, ION BEAMS

IDENTIFIERS: (U) Penning ionization, Chemionization, Ion molecule interactions, WUAFOSR2301A4, PE61102F

AD-A170 859

AD-A170 845 20/6 7/4

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER PITTSBURGH PA

(U) Program to Develop an Optical Transistor and Switch.

DESCRIPTIVE NOTE: Annual rept. no. 1, 1 Apr-30 Sep 85,

OCT 85 25P

PERSONAL AUTHORS: Henningsen,T. ;Garbuny,M. ;Hopkins,R. H. ;

REPORT NO. 85-9F42-NUTRN-R2

CONTRACT NO. F49620-84-C-0103

PROJECT NO. 2305

TASK NO. B4

MONITOR: AFOSR TR-88-0544

UNCLASSIFIED REPORT

ABSTRACT: (U) Work during this period evaluated analytically the concept of multistage optical transistors based on two spectroscopically complementary materials. It is shown that very high total gains can be obtained with either of two alternatives, viz., (1) a chain of discrete complementary transistor units, or (2) a complementary transistor continuum (a concept which has no electronic analog). Whereas the total gain grows exponentially with the number of stages, the required constant photon fluxes grow only linearly with that number. High signal-to-noise ratios can be obtained without the need of cooling. However, the spectroscopic matching conditions of the two complementary materials are stringent. Under the guidance of the theoretical work, a search for suitably matching materials is now underway. (Author)

DESCRIPTORS: (U) *TRANSISTORS, *OPTICS, *SWITCHING CIRCUITS, STACKING, SPECTROSCOPY, SIGNAL TO NOISE RATIO, RADIATION ABSORPTION, LINEAR SYSTEMS, PHOTONS, NOISE, CROSS SECTIONS, RESPONSE, LITHIUM, GAIN, SODIUM

IDENTIFIERS: (U) Complementary materials, Collector

AD-A170 845

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO EVN34M

AD-A170 845 CONTINUED

beams, Evan[illegible]ent wave, Control beams, Optical transistors [illegible]ns(Optical), Continuum transistors, PE61102F, W[illegible]SR?30584

AD-A170 840 9/2

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

(U) Experimentation in Software Engineering.

NOV 85 38P

PERSONAL AUTHORS: Basili,Victor R. ;Selby,Richard W. Jr. ;Hutchens,David H. ;

REPORT NO. TR-1575

CONTRACT NO. F49620-80-C-0001

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR TR-86-0580

UNCLASSIFIED REPORT

ABSTRACT: (U) Experimentation in software engineering supports the advancement of the field through an iterative learning process. This paper presents a framework for analyzing most of the experimental work performed in software engineering over the past several years. We describe a variety of experiments in the framework and discuss their contribution to the software engineering discipline. Some useful recommendations for the application of the experimental process in software engineering are included. (Author)

DESCRIPTORS: (U) *COMPUTER PROGRAMMING, *SYSTEMS ENGINEERING, ITERATIONS, LEARNING, EXPERIMENTAL DESIGN, PLANNING

IDENTIFIERS: (U) *Software engineering, WUAFOSR2304A3, PE61102F

AD-A170 939 4/1 7/5

COLORADO UNIV BOULDER

(U) State-Resc Dynamics of Ion-Molecule Reactions in a Flowing Af low.

DESCRIPTIVE NOT Final rept 1 Oct 82-30 Sep 85.

NOV 85.

SONAL AUTH Leone,Stepen R. ;Bierbaum,Veronica M. ;
E111: Q B

NTRACT NO. 20-83-C-0015

OJECT NO. 2

ASK NO. B1

NITOR: AFO
TR 2

UNCLASSIFIED REPORT

STRACT: (U) extensive set of studies was undertaken utilizing in chemiluminescence, visible chemilumines and laser induced fluorescence detection to re the dynamics o. ion molecule reactions in wing afterglow apparatus. Detailed product vibra al state distributions were determined for a variety reactions including heavy atom transfer in polyatomic tems, charge transfer reactions a proton transf actions. Absolute branching ratios for production of tronically excited oxygen atoms were measured for ction of atmospheric importance. The rotational st distribution of an ion in an electric drift field r en characterized and a study of the velocity dist tion has been initiated.

SCRIPTORS: *AFTERGLOWS, *CHEMILUMINESCENCE, *LASER INDUCED FLUO CE, VISIBLE SPECTRA, INFRARED SPECTRA, MOLECULAR VI N, MOLECULAR ROTATION, CHARGE TRANSFER, PROTON REACTI

ENTIFIERS: Ion molecule interactions, Heavy atoms, WUAFOSR2303B1 61102F

AD-A170 838 20/3 4/2

WASHINGTON UNIV SEATTLE

(U) Radiative Energy Transfer and Thermal Management in Advanced Space Power and Propulsion Systems.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 83-30 Sep 84,

MAR 88 24P

PERSONAL AUTHORS: Mattick,A. T. ;Hertsberg,A. ;

CONTRACT NO. AFOSR-83-0367

PROJECT NO. 2301

TASK NO. K2

MONITOR: AFOSR
TR-88-0565

UNCLASSIFIED REPORT

ABSTRACT: (U) This work involved a theoretical study of radiation transf in droplet clouds, for predicting the performance of the liquid droplet radiator. The effects on droplet sheet emissivity of non isotropic scattering by droplets and of the development of a temperature profile on the droplet sheet are shown to be small.

DESCRIPTORS: (U) *ELECTROMAGNETIC SCATTERING, *CLOUDS, DROPS, RADIATIVE TRANSFER, EMISSIVITY, ANISOTROPY

IDENTIFIERS: (U) *LDR(Liquid Droplet Radiator), Stefan Boltzmann Law, Droplet sheets, WUAFOSR2301K2, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 837 9/5 20/5

COLUMBIA ..V NEW YORK DEPT OF ELECTRICAL ENGINEERING

(U) Direct ..iting of Microstructures for Solid-State Electr ..s.

DESCRIPTIVE ..TE: Final rept. 1 Feb 84-31 Jan 88,

APR 88 84P

PERSONAL A.. ..S: Osgood,Richard M. , Jr.

CONTRACT NO. F49620-84-C-0022, ARPA Order 4487

PROJECT NO 2301

TASK NO.

MONITOR: ..R
..-0555

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes two years of research ..ew laser processing techniques on opto- and microele.. ..ics. The main results are in 1) the demonstr.. ..of UV laser direct writing of low resistivi.. ..tal lines, and the subsequent demonstration of the u.. ..ess of laser writing (via deposition) in the reco.. ..ing of an LSI circuitry, and 2) the discover.. ..aracterization, and understa ding of the technique ..light-guided etching for the fabrication of ultra-hi.. ..ect-ratio microelectronics structures. In the case ..ght-guided e..ching, an application of the technique ..optical inte..connects has already been demonstra.. (Author)

DESCRIPTORS: (U) *CIRCUIT INTERCONNECTIONS, *MICROEL.. ..ICS, *LASER BEAMS, *INTEGRATED CIRCUITS, *ULTRAVI.. ..LASERS, DEPOSITION, ETCHING, SUBSTRATES, INDIUM, A.. ..UM, TUNGSTEN, MOLYBDENUM, CARBON MONOXIDE, GLASS

IDENTIFIERS: (U) Direct writing, Laser processing, Metal lines, Pa.. ..etching, Diffraction gratings, *AFOSR2301A1, PE61102F

AD-A170 837

AD-A170 838 9/2 9/5

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

(U) A Design by Example: Regular Structure Generator.

DESCRIPTIVE NOTE: Master's thesis,

FEB 85 114P

PERSONAL AUTHORS: Bamji,Cyrus S. ;

REPORT NO. TR-507

CONTRACT NO. F49620-84-C-0004

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR
TR-88-0501

UNCLASSIFIED REPORT

ABSTRACT: (U) This thesis investigates technical issues concerning the automated generation of highly regular VLSI circuit layouts (e.g. RAMs, PLAs, systolic arrays) that are crucial to the designability and realizability of large VLSI systems. The key is to determine the most profitable level of abstraction, which is accomplished by the introduction of true macro abstraction, interface inheritance, delayed bindi.. ..nd the complete decoupling of procedural and graphical design information. These abstraction mechanisms are implemented in the Regular Structure Generator, an operational layout generator with significant advantages over first generation layout tools. Its advantages are demonstrated by a pipelined array multiplier layout example. A leaf cell compactor that can make the RSG technology transportable is also investigated. (Author)

DESCRIPTORS: (U) *COMPUTER AIDED DESIGN, *GENERATORS, *INTEGRATED CIRCUITS, *STRUCTURES, *COMPUTER GRAPHICS, COUPLING(INTERACTION), RANDOM ACCESS COMPUTER STORAGE, ARRAYS, THESES

IDENTIFIERS: (U) RSG(Regular Structure Generators), Pipelined arrays, DBE(Design By Example), Delayed binding.

AD-A170 838

AD-A170 838 ...NTINUED

Macro abstr... ion, Cells, Adders, Interface inheritance, Decoupling... cuit layouts, MUAFOSR220583, PE81102F

AD-A170 833 17/7

TEXAS UNIV AT AUSTIN DEPT OF AEROSPACE ENGINEERING AND ENGINEERING MECHANICS

(U) Advanced Guidance Algorithms for Homing Missiles with Bearing-only Measurements.

DESCRIPTIVE NOTE: Annual technical rept.,

MAY 86 10P

PERSONAL AUTHORS: Speyer,Jason L. ;Hull,David G. ;

CONTRACT NO. AFOSR-84-0371

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR TR-86-0595

UNCLASSIFIED REPORT

ABSTRACT: (U) The research of this grant is directed toward the development of an advanced guidance system (navigation filter and guidance law) for a short-range air-to-air missile having a passive seeker (angle-only measurements). During this year, four subjects have been investigated. First, additional experience has been gained with the modified-gain extended Kalman filter; it is becoming apparent that it works the same as or better than the extended Kalman filter for the homing missile problem. Second, a new target-acceleration model has been developed to replace the first-order Gauss-Markov process normally used; this model allows target acceleration vector to rotate and keeps its magnitude within bounds Third, because the homing missile problem with angle-only measurements is nonlinear, the guidance law affects the performance of the filter; a new guidance law based on maximizing a measure of the size of the information matrix has been developed and has been shown to improve filter performance. Fourth, a study of the use of new theory on fault detection has been initiated; the intent is to use this theory to detect target maneuvers (the target maneuver appears as a fault) so that the filter can be restarted. (Author)

DESCRIPTORS: (U) *HOMING DEVICES, *KALMAN FILTERING,

AD-A170 838

AD-A170 833

AD-A170 833 CONTINUED

BEARING(DIRECTION), AIR TO AIR MISSILES, GUIDANCE, PASSIVE SYSTEMS, ALGORITHMS

IDENTIFIERS: WUAFOSR2304A3, PE61102F

AD-A170 831 9/5 9/1 20/12

PURDUE UNIV LAFAYETTE IN SCHOOL OF ELECTRICAL ENGINEERING

(U) Investigation of a New Concept in Semiconductor Microwave Oscillators.

DESCRIPTIVE NOTE: Interim rept.,

NOV 85 4P

PERSONAL AUTHORS: Cooper,James A. , Jr;

CONTRACT NO. AFOSR-85-0193

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR TR-86-0597

UNCLASSIFIED REPORT

ABSTRACT: (U) Our project centers on the fabrication and characterization of a new type of millimeter-wave semiconductor oscillator, the so-called 'Contiguous-Domain' Transferred-Electron Oscillator. To date, the only operational information we have about this device has been derived from computer simulation, and therefore our objective is to obtain experimental verification. The device is interesting (and potentially important) because it operates in a fundamentally different way from any existing semiconductor oscillator device, with the result that it should be capable of very high frequency oscillation (over 100 GHz) without the requirement for sub-micron drift dimensions. In addition, the oscillations are not based on a transit-time effect, and thus the frequency can be changed during operation by simply changing the rate at which carriers are admitted into the drift channel. The structure is similar to a conventional GaAs MESFET or MODFET, except that the gate is made resistive and has two contacts, one near the source and the other near the drain. We will not describe the operation of the device in detial here, but refer the reader to the original proposal and to the enclosed article.

DESCRIPTORS: (U) *MICROWAVE OSCILLATORS, *FIELD EFFECT TRANSISTORS, *GALLIUM ARSENIDES, COMPUTERIZED SIMULATION,

AD-A170 831

AD-A170 831 CONTINUED

ELECTRONS

IDENTIFIERS: (U) CDTEO(Contiguous Domain Transferred Electron O[illator]), Drains, Sources, Resistive gates, Domains, [illegible]/CSR2305C1, PE81102FR

AD-A170 830 9/4 5/10 9/2 5/2

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) Distributed Knowledge Base Systems for Diagnosis and Information Retrieval.

DESCRIPTIVE NOTE: Annual rept. 1 Jul 84-30 Jun 85,

SEP 85 104P

PERSONAL AUTHORS: Chandrasekaran,B. ;

CONTRACT NO. AFOSR-82-0255

PROJECT NO. 2304

TASK NO. K1

MONITOR: AFOSR TR-86-0509

UNCLASSIFIED REPORT

ABSTRACT: (U) During the year, progress was made in our research on distributed approaches to knowledge-based problem-solving in the following areas: 1) We have developed an approach called consolidation to reason qualitatively about the behavior of systems of components. This approach and the more classical approach of qualitative simulation are complementary. 2) We have made further progress in developing an architectural framework for diagnostic reasoning. 3) We have elucidated some of the criteria that govern how design plans are selected for further refinement in design problem solving. 4) We have identified a number of generic tasks into which the information processing activity of most of the expert systems can be decomposed. These generic tasks are at a much higher level of abstraction, and this should make knowledge acquisition and explanation for expert systems easier. 5) We have clarified how symbolic qualitative knowledge-based processing helps when problems get complex by considering the concrete task of classification. We compare the pattern recognition and AI approaches to the problem. (Author)

DESCRIPTORS: (U) *REASONING, *COMPUTER AIDED DIAGNOSIS, *PROBLEM SOLVING, *INFORMATION SYSTEMS, INFORMATION RETRIEVAL, FUNCTIONS, DECISION MAKING, COMPUTER AIDED DESIGN, LOGIC DEVICES, DATA BASES, ARTIFICIAL

AD-A170 831

AD-A170 830

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 830 CONTINUED

INTELLIGENCE, QUALITATIVE ANALYSIS, SIMULATION

IDENTIFIERS (U) Expert systems, Knowledge based systems, Distribution retrieval, LPN-OSURF-763150/714858, PE61102F, WUAFOSR2303A1

AD-A170 819 7/4 7/3

PRINCETON UNIV NJ DEPT OF CHEMICAL ENGINEERING

(U) Organosulfur Chemistry on W(211) Surfaces. 1. A Comparison of Methanethiol and Methanol.

85 9P

PERSONAL AUTHORS: Benziger,Jay B. ;Preston,Richard E. ;

CONTRACT NO. AFOSR-82-0302

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR TR-86-0581

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v89 n23 p5002-5010 1985. See also 2, AD-A170 818.

ABSTRACT: (U) The reactions of methanol and methanethiol on clean, oxided, sulfided, and carbided W(211) surfaces were studied by LEED, AES, and TPR. Adsorption occurred by an oxidative addition in which the hydroxyl or sulfhydryl hydrogen was removed forming methoxy and methanethioxy intermediates. Clean W(211) was a very strong reductant totally decomposing the molecules. Adsorbed oxygen oxidized the surface making it a weaker reducing agent so that alkoxy and thioxy intermediates were stabilized. An epitaxial surface oxide was a mild oxidant compared to clean W(211); this surface oxidized methanol to formaldehyde. Adsorbed sulfur severely reduced methanol adsorption. Surfaces with adsorbed sulfur methanethiol. This adsorption suggests the formation of disulfide species. Carbided W(211) stabilized both alkoxy and thioxy intermediates as well as oxidizing methanol to formaldehyde. The adsorbed methoxy and methanethioxy intermediates decomposed by C-O or C-S bond scission forming adsorbed methyl groups which either decomposed or were hydrogenated to form methane. At temperatures above 500 K methyl groups recombined and C2 hydrocarbon products evolved. Surface oxides and carbides oxidized methoxy to formaldehyde and CO, but no surface oxidized methanethioxy to thioformaldehyde or CS.

AD-A170 830

AD-A170 819

AD-A170 819 CONTINUED

DESCRIPTORS: (U) •SURFACE CHEMISTRY, •SURFACE REACTIONS, •METHANE [illegible]IOLS, •CARBINOLS, TUNGSTEN, ADSORPTION, OXIDATIO[illegible]DITION REACTIONS, REDUCTION(CHEMISTRY), SULFUR, [illegible]CARBONS

IDENTIFIERS: (U) Methanethiols, Methanol, PE61102F, WUAFOSR2[illegible]2

AD-A170 818 7/4 7/3

PRINCETON UNIV NJ DEPT OF CHEMICAL ENGINEERING

(U) Organosulfur Chemistry on W(211) Surfaces. 2. A Comparison of Benzene, Thiophene, and Tetrahydrothiophene.

85 9P

PERSONAL AUTHORS: Preston,Richard E. ;Benziger,Jay B. ;

CONTRACT NO. AFOSR-82-0302, NSF-CPE82-17384

PROJECT NO. 2302

TASK NO. A2

MONITOR: AFOSR TR-86-0582

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v89 n23 p5010-5017 1985. See also 1, AD-A170 819.

ABSTRACT: (U) The interactions of benzene, thiophene, and tetrahdyrothiophene with clean, oxidized, and sulfided W(211) surfaces were studied with LEED, AES, and temperature programmed reaction. Benzene and thiophene appear to absorb as bases making pi-bonds to the surface. Benzene decomposed to yield adsorbed carbon and hydrogen. Thiophene appeared to undergo electrophilic attack at the 2-position forming a carbon bound surface intermediate. This surface intermediate was desulfurized and the resulting hydrocarbon surface intermediate underwent C-C bond scission forming C3 hydrocarbons as the dominate desorption product. The electrophilic attack at the 2-position was shown by methyl group elimination from 2,5-dimethylthiophene. Adsorbed oxygen and sulfur enhanced the adsorption of benzene and thiophene by making the surface more acidic. Tetrahydrothiophene (THT) appear to adsorb as a base, forming a bond between the S(3p) electrons and the surface. Desulfurization of adsorbed THT led to C4 hydrocarbons as the dominate desorption product. Adsorbed oxygen and sulfur inhibited reaction of THT. These results suggest that the surface reactivity and subsequent desulfurization of thiophene is controlled by electrophilic attack on the aromatic ring, and the ensuing reduction of resonance stabilization facilitates

AD-A170 818

AD-A170 818 CONTINUED

sulfur r val.

DESCRIPTO (U) *SURFACE CHEMISTRY, *SURFACE REACTIONS, *BENZENE (IOPHENES, TUNGSTEN, INTERACTIONS, ADSORPTION, DECOMPO N, SUBSTITUTION REACTIONS, ADSORPTION, DESULFUR TION, HYDROCARBONS, REPRINTS

IDENTIFIER (U) Thio we/Tetrahydro, Electrophilic reactio E61102F, WU SR2302A2

AD-A170 818 12/2

ILLINOIS UNIV AT CHICAGO CIRCLE DEPT OF MATHEMATICS STATISTICS AND COMPUTER SCIENCE

(U) On Bounds for the Efficiency of Block Designs for Comparing Test Treatments with a Control.

DESCRIPTIVE NOTE: Technical rept.,

JUN 88 24P

PERSONAL AUTHORS: Stufken,John ;

REPORT NO. TR-88-05

CONTRACT NO. AFOSR-88-0320

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0578

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper studies the class of augmented balanced incomplete block designs, which are used for comparing a control treatment with a set of test treatments. Under the A criterion a condition is established that enables us to determine the most efficient augmented design and we suggest some methods to compute a lower bound for the efficiency of these designs. For 3 < or = k > or = k the parameters of the most efficient designs with a lower bound for their efficiency or, if known, mention their optimality.

DESCRIPTORS: (U) *CONTROL THEORY, *SYSTEMS ENGINEERING, AUGMENTATION, OPTIMIZATION, EFFICIENCY, LEAST SQUARES METHOD

IDENTIFIERS: (U) *Block design, BIB(Balanced Incomplete Block), BIBD(Balanced Incomplete Block Design), PE61102F, WUAFOSR2304A5

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 815 20/3

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF METEOROLOGY

(U) Sum Rules for Optical Extinction and Scattering by Small Particles.

DESCRIPTIVE NOTE: Annual rept. 18 May 84-18 May 85,

MAR 86 25P

PERSONAL AUTHORS: Bohren,Craig F. ;

CONTRACT NO. AFOSR-84-0145

PROJECT NO. 2308

TASK NO. C4

MONITOR: AFOSR TR 86-0517

UNCLASSIFIED REPORT

ABSTRACT: (U) The solution to the problem of scattering by an arbitrary homogeneous sphere (Mie theory) yields an infinite set of coefficients. These scattering coefficients depend on various Bessel functions and their derivatives. The usual approach to computing scattering coefficients is to compute the Bessel functions by recurrence. The Bessel functions in the expressions for the scattering coefficients satisfy recurrence relations. It has been shown that the scattering coefficients themselves satisfy recurrence relations. Whether or not the recurrence relations can simplify scattering calculations must be determined by extensive calculations. It is not known if the recurrence relations are stable, either upward or downward. These matters are for further investigation.

DESCRIPTORS: (U) *MIE SCATTERING, *LIGHT SCATTERING, OBSCURATION SMOKE, EXTINCTION, MATHEMATICAL ANALYSIS, BESSEL FUNCTIONS, COEFFICIENTS

IDENTIFIERS: (U) Sum rules(Physics), Recurrence relations, Kramers Kronig relations, PE61102F, WUAFOSR2308A1

AD-A170 815

AD-A170 813 20/12 20/3

BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

(U) Picosecond Nonlinear Resonant Interactions in Semiconductors.

DESCRIPTIVE NOTE: Annual rept. no. 3, 1 Jan-31 Dec 84,

MAR 86 15P

PERSONAL AUTHORS: Aurmikko,Arto V. ;

CONTRACT NO. F49620-82-C-0044

PROJECT NO. 2306

TASK NO. C2

MONITOR: AFOSR TR-86-0525

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was aimed at advancing understanding and utilization of selected optical properties of semiconductors containing magnetic elements. Emphasis was placed on the interaction of such materials with ultrashort pulses of laser radiation in order to study coupled electronic and magnetic excitations under selected nonequilibrium conditions. We hoped to generate novel results through experimental research for applications to fast optoelectronic devices. The mixed crystal semiconductors (Cd, Mn)Se and (Cd, Mn)Te were used. The contract work has generated a number of 'firsts', e.g., we measured the formation of local, microscopic magnetically oriented domains through real-time spectroscopy with picosecond laser pulses. (Author)

DESCRIPTORS: (U) SEMICONDUCTORS, *MAGNETIC MATERIALS, *BAND THEORY OF SOLIDS, *MAGNETIC DOMAINS, CADMIUM COMPOUNDS, MANGANESE COMPOUNDS, LIGHT PULSES, SELENIDES, PULSED LASERS, TELLURIDES, NONLINEAR SYSTEMS, SPECTROSCOPY, REAL TIME, EXCITONS, DYE LASERS

IDENTIFIERS: (U) Cadmium manganese selenide, DMS(Diluted Magnetic Semiconductors), BMP(Bound Magnetic Polarons), Resonant interactions, Cadmium Manganese telluride, Neutral impurities, Free excitons, Ionic impurities, Bound excitons, Coulomb centers, Potential wells,

AD-A170 813

AD-A170 813 CONTINUED

Polarons, Charge compensation, PE61102F, WUAFOSR2306C2

AD-A170 812 20/12 9/1 20/2

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

(U) High-Quality GaAs MESFET's Grown on Silicon Substrates by Molecular-Beam Epitaxy,

JUL 85 4P

PERSONAL AUTHORS: Morkoc,H. ;Peng,C. K. ;Henderson,T. ; Kopp,W. ;Fischer,R. ;

CONTRACT NO. F49620-83-K-0021

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR TR-86-0541

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Electron Devices Letter, vEDL-6 n7 p381-383 Jul 85.

ABSTRACT: (U) High-quality epitaxial films of 2.3-micron thick GaAs were grown on 3-in-diam(100) Si substrates misoriented by 4 deg toward (110). The total morphological defect density observed was (2000 per sq cm) comparable to what is obtained on a typical GaAs grown on GaAs in this particular MBE process. The electron mobilities and doping levels were 3350 sq cm/Vs and 3 x 10 to the 17 power per cu cm, which are comparable to GaAs on GaAs of equivalent parameter MESFET's with a 1 micron gate lengths, exhibited good saturation and pinch off, no observable light sensitivity, and transconductances of about 200 mS/mm. These results are believed to be the first report of such excellent MESFET quality GaAs directly grown on Si. (Author)

DESCRIPTORS: (U) *GALLIUM ARSENIDES, *SILICON, *MOLECULAR BEAMS, *EPITAXIAL GROWTH, *FIELD EFFECT TRANSISTORS, SUBSTRATES, GATES(CIRCUITS), PHOTOSENSITIVITY, REPRINTS

IDENTIFIERS: (U) Transconductances, MESFETA,PE61102F, WUAFOSR2305C1

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD A170 811 2[illegible]3 20/5

YALE UNIV NEW H[illegible]VEN CONN

(U) Population In[illegible]orsions in Laser-Initiated Vacuum Arcs.

DESCRIPTIVE NOTE: Final rept. 1 Feb 81-31 Jan 88,

JUN 88 77P

PERSONAL AUTHORS: Krishnan,Mahadevan ;Haller,Gary L. ;

CONTRACT NO. AF[illegible]R 81-0077

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR
TR-88-[illegible]22

UNCLASSIFIED REPORT

ABSTRACT: (U) P[illegible]ulation inversions were studied in laser initiated [illegible]cuum arcs. Inversion mechanisms include t[illegible]ree body rec[illegible]nation pumping in expanding, laser [illegible]oduced plasma[illegible] and resonant photoexcitation using line radiation. Sign[illegible]icant gain was measured on the Balmer lines H sub alp[illegible] and H sub beta in expanding, laser [illegible]oduced plasma[illegible] of carbon/polyethylene Research then [illegible]ocused on reso[illegible]nt photoexcitation of one ion by line radiation from [illegible]nother ion. Fluorescence was measured at UV wavelengths [illegible] CII pumped by Al III. A new class of [illegible]otoexcited la[illegible]s was identified, in Be like ions, with wavelengths fro[illegible] 2177A in C III pumped by Mn VI, to 200 A in Mg IX pumped [illegible]y Al XI. Fluorescence and small signal [illegible]ain were measu[illegible] in C III pumped by Mn VI. Finally, laser oscillati[illegible] was demonstrated in C III at 2177 and 2[illegible]83A. These ar[illegible]e first UV lasers to be pumped by resonant photo[illegible]itation. By isoelectronic scaling, it should be possi[illegible] to produce soft X-ray lasers using the principles eluc[illegible]ated by this research. Photopumped lasers could pr[illegible]e to be the most efficient soft X ray lasers in the f[illegible]ure.

DESCRIPTORS: (U) *ELECTRIC ARCS, *LASER PUMPING, *ULTRAVIOLET LASERS, RECOMBINATION REACTIONS, FLUORESCENCE, P[illegible]ETHYLENE, LASER INDUCED FLUORESCENCE, ULTRAVIOLET RADIATION

AD A170 811

AD-A170 811

AD-A170 811 CONTINUED

IDENTIFIERS: (U) Laser produced plasmas

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 810 17/2

CALIFORNIA UNIV LOS ANGELES SCHOOL OF ENGINEERING AND APPLIED SCIENCE

(U) Performance Evaluation and Control of Distributed Computer Communication Networks.

DESCRIPTIVE NOTE: Annual rept.,

SEP 85 42P

PERSONAL AUTHORS: Rubin,Izhak ;Gerla,Mario ,

REPORT NO. UCLA-ENG-85-30

CONTRACT NO. AFOSR-82-0304

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR TR-86-0580

UNCLASSIFIED REPORT

ABSTRACT: (U) During the 1982-1985; performance-period under this AFOSR Grant, we have carried out research investigations and obtained many significant results, of both theoretical and practical importance. A large multitude of computer communication network architectures, models and control schemes have been developed, analyzed and evaluated.

DESCRIPTORS: (U) *COMPUTER COMMUNICATIONS, *COMMUNICATIONS NETWORKS, MULTIPLE ACCESS, SWITCHING CIRCUITS, DATA COMMUNICATIONS, PERFORMANCE(ENGINEERING), INTEGRATED SYSTEMS, FIBER OPTICS, TELECOMMUNICATIONS, VIDEO INTERACTION, MULTIPLEXING, ALGORITHMS

IDENTIFIERS: (U) LAN(Local Area Networks), Packet radios, Network protocols, Token rings, Token busses

AD-A170 810

AD-A170 809 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Pattern Recognition Based on Scale Invariant Discriminant Functions.

DESCRIPTIVE NOTE: Technical rept.,

APR 86 18P

PERSONAL AUTHORS: Pukkila,Tarmo M. ;Rao,C. R. ;

REPORT NO. TR-86-09

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0578

UNCLASSIFIED REPORT

ABSTRACT: (U) Some probability models for classifying individuals as belonging to one of two or more populations using scale invariant discriminant functions are considered. The investigation is motivated by practical situations where the observed data on an individual are in the form of ratios of some basic measurements or measurements scaled by an unknown non-negative number. The probability models are obtained by considering a p-vector random variable X with a known distribution and deriving the distribution of the random vector Y = G(X) . X, where G(X) is a non-negative measure of size such that G(lambda X) = Lambda G(X) for lambda > 0. Explicit expressions are obtained for the densities of what are called Angular Gaussian, Compositional Gaussian, Type 1 and Compositional Gaussian, Type 2 distributions. (Author)

DESCRIPTORS: (U) *DISCRIMINATE ANALYSIS, *PROBABILITY DISTRIBUTION FUNCTIONS, PATTERN RECOGNITION, POPULATION(MATHEMATICS), MATHEMATICAL MODELS, RANDOM VARIABLES, NORMAL DISTRIBUTION, ESTIMATES, DENSITY .

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F

AD-A170 809

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD A170 808 7/4

(SYLVANIA STAT. UNIV UNIVERSITY PARK DEPT OF
AISTRY

(U) Matrix Effect[s] in the Electronic Partitioning of Iron Atoms Desorb[ed] from Surfaces by Energetic Ion Bombardment.

DESCRIPTIVE NOTE: Technical rept. 1 Nov 84-31 Oct 85,

[D]EC 85 69

PERSONAL AUTHORS: Kimock,Fred M. ;Pappas,David L. ;
[K]ogrsd,Nicholas ;

CONTRACT NO. AF[O]SR-85-0028, NSF-CHE81-08382

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-88-[0]283

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Analytical Chemistry, v57 n13 p2869-2874 Nov 85

ABSTRACT: (U) The effect of the sample matrix on the electronic partitioning of sputtered Fe atoms is examined. The surface studied are clean and air exposed polycrystalline Fe, Ni3Fe (111) and NBS 1264a steel. In contrast to the yield of secondary Fe+ (which for all samples is increased dramatically by surface contamination), the fraction of ejected ground state Fe atoms is relatively insensitive to surface contamination. When the clean targets are subjected to 900 eV argon ion bombardment, the populations of ejected metastable excited state Fe atoms are characterized by near Boltzmann distributions with effective temperatures of about 700 + or - 100 K. The populations of Fe atoms sputtered from air exposed surfaces are also near Boltzmann in character, with effective temperatures up to 1400 + or - 200

DESCRIPTORS: (U) +DESORPTION, +IRON, +ION BOMBARDMENT, SILICON, SPUTTERING, STEEL, IRON INTERMETALLICS, NICKEL INTERMETALLICS, BOLTZMANN EQUATION, REPRINTS

AD-A170 808

AD-A170 808 CONTINUED

IDENTIFIERS: (U) Partition functions, Steel 1264A, Electronic partitioning

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 808 4

TORONTO UNIV (ONTARIO) DOWNSVIEW (ONTARIO) INST FOR AEROSPACE STUDIES

(U) Pseudo-Stationary Oblique-Shock-Wave Reflections in a Polyatomic Gas: Sulfur Hexafluoride.

DESCRIPTIVE NOTE: Interim rept.,

JAN 88 17 P

PERSONAL AUTHORS: HU,T. C. ;

REPORT NO. UTIAS TN-283

CONTRACT NO. AFOSR 82-0098

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR TR-88-0572

UNCLASSIFIED REPORT

ABSTRACT: (U) Pseudo-stationary oblique-shock-wave reflections in sulfur hexafluoride were investigated experimentally and numerically. Over 150 experiments were conducted in the UTIAS 10 x 18 cm Hypervelocity Shock Tube in the range of incident shock wave Mach number 1.25 < M sub s < 3.0 and wedge angle 4 deg < theta sub w < 47 deg with initial pressures P sub o ranging from 4 to 267 torr (0.53 to 35.90 kPa) and initial temperatures T sub o near 300 K. The four major types of shock wave reflection, i.e., regular reflection (RR) single-Mach reflection (SMR), Complex-Mach reflection (CMR) and double-Mach reflection (DMR) were observed. These were studied with infinite-fringe interferograms using a 23 cm dia field of five Mach-Zehnder interferometer. The isopycnics obtained and the density distributions along the wedge surface are presented for the various reflection processes. Four experimental results in argon, air, carbon dioxide and sulfur hexafluoride with the same wedge angle and similar Mach numbers are compared. The analytical transition boundaries between the four types of shock-wave reflection were established up to M sub s = 10.0 for frozen and vibrational equilibrium sulfur hexafluoride. The numerical results of the second triple-point system

AD-A170 808 CONTINUED

show that for a given incident shock Mach number, the highest pressure is achieved through a DMR instead of a RR. An application of reflections in pseudo-stationary flow to the interaction of spherical blast waves with a planar surface is shown and discussed.

DESCRIPTORS: (U) *SHOCK WAVES, *REFLECTION, *SULFUR COMPOUNDS, *FLUORIDES, SHOCK TUBES, HIGH VELOCITY, PRESSURE, TEMPERATURE, MACH NUMBER, FLOW, BOUNDARIES, BLAST WAVES, INTERFEROMETRY, GASES, NUMERICAL ANALYSIS, VIBRATION, EQUILIBRIUM(GENERAL), RELAXATION, CANADA

IDENTIFIERS: (U) WUAFOSR2307A1, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 805 9/1 20/12

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

(U) Quasi Fermi Level Bending in MODFET's and Its Effect on FET Transfer Characteristics.

JUN 85 8P

PERSONAL AUTHORS: Ponse,F. ;Masselink,W. T. ;Morkoc,Hadis ;

CONTRACT NO. F49620-83-K-0021

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR TR-86-0538

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Electron Devices, vED-32 n6 p1017-1023 Jun 85.

ABSTRACT: (U) Using Schockley's diffusion/drift model, we calculate the quasi-Fermi level (imref) bending in the depleted AlGaAs barrier layer of GaAs/AlGaAs MODFET's. We show that the assumption of a constant imref from the heterointerface through the barrier layer is not justified when the gate is moderately forward biased. Once the barrier-layer conduction band edge at the gate interface falls below that at the heterointerface, the imref curves both in the vicinity of the heterointerface and at the gate metal. This has important consequences for the MODFET transfer characteristics and necessitates new considerations for the gate control mechanism. As a result, almost electron concentrations in the MODFET channel exceeding the equilibrium concentrations are obtained despite the gate being forward biased with voltages close to or larger than the Schottky-barrier height, the gate current is suppressed not only by the barrier at the heterointerface but also by a barrier of about the same height present at the gate metal-semiconductor interface. Experimental results on AlGaAs/GaAs MODFET's are in good quantitative agreement with the theoretical calculations. (Author)

DESCRIPTORS: (U) *FIELD EFFECT TRANSISTORS, *DOPING,

AD-A170 805

AD-A170 805 CONTINUED

*FERMI SURFACES, *GALLIUM ARSENIDES, *SCHOTTKY BARRIER DEVICES, INTERFACES, GATES(CIRCUITS), DRIFT, NONLINEAR SYSTEMS, REPRINTS, BIAS

IDENTIFIERS: (U) Modfet devices, Aluminum gallium arsenide, Modulation doping, PE61102F

AD-A170 805

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 804 6/16 6/15

HARVARD MEDICAL SCHOOL BOSTON MA DEPT OF PHYSIOLOGY AND BIOPHYSICS

(U) Pharmacological Resetting of the Circadian Sleep-Wake Cycle.

DESCRIPTIVE NOTE: Final technical rept. 1 Apr 83-31 Mar 86.

MAY 86 27P

PERSONAL AUTHORS: Moore-Ede,Martin C. ;

CONTRACT NO AFOSR-83-0184

PROJECT NO 2312

TASK NO. A1

MONITOR: AFOSR TR-86-0845

UNCLASSIFIED REPORT

ABSTRACT: (U) This research program developed strategies to reset the timing of the circadian (approximately 24-hour) sleep-wake cycle so that individuals could be maintained fully awake in any predetermined time in the 24-hour day. This capability would be of direct benefit in minimizing the deleterious effects of jet-lag and could promote alertness in facilities which must be staffed 24 hours a day. The studies utilized a diurnal primate primate, the squirrel monkey (Saimiri sciureus), with a well defined circadian neurophysiology and sleep-wake physiology. This animal has a consolidated sleep-wake cycle that is comparable to that in humans. During the three year period of funding, the circadian sleep-wake organization in squirrel monkeys was characterized, and the rate of resynchronization after phase shifts of environmental light-dark cycles was determined.

DESCRIPTORS: (U) *CIRCADIAN RHYTHMS, *JET LAG, *DRUGS, SLEEP, TEST, PHYSIOLOGICAL EFFECTS, SQUIRREL MONKEYS, NEUROPHYSIOLOGY

IDENTIFIERS: (U) Muramyl Dipeptide, Anisomycin, Sodium Valproate, WUAFOSR2312A1, PE81102F

AD-A170 804

AD-A170 803 12/1

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF APPLIED MATHEMATICS AND STATISTICS

(U) The Multi-Armed Bandit Problem: Decomposition and Computation.

DESCRIPTIVE NOTE: Research rept. Jul 84-Sep 85,

SEP 85 15P

PERSONAL AUTHORS: Katehakis,Michael N. ;Veinott,Arthur F. , Jr;

REPORT NO. AMS-85-58

CONTRACT NO. AFOSR-84-0138, NSF-ECS83-12356

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0523

UNCLASSIFIED REPORT

ABSTRACT: (U) The multi-armed bandit problems arises in sequentially allocating effort to one of N projects and sequentially assigning patients to one of N treatments in clinical trials. Gittins and Jones (1974) have shown that one optimal policy for the N-project problem, an N-dimensional discounted Markov decision chain, is determined by the following largest-index rule. There is an index for each state of each given project that depends only on the data of that project. In each period one allocates effort to a project with largest current index. The purpose of this paper is to give a short proof of this result and a new characterization of the index of a project in state i, viz., as the maximum expected present value in state i for the restart-in-i problem in which, in each state and period, one either continues allocating effort to the project or immediately restarts the project in state i. Moreover, it is shown that an approximate largest-index rule yields an approximately optimal policy. These results lead to more efficient methods of computing the indices on-line and/or for sparse transition matrices in large state spaces than have been suggested heretofore. By using a suitable

AD-A170 803

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 803 CONTINUED

implementation of successive approximations, a policy whose expected present value is within 100 epsilon % of the maximum possible range of values of the indices can be found online with at most (N+T-1)TN operations where N is the number of operations required to calculate one approximation, T = (ln epsilon)/(ln a) and 0 < a < 1 is the discount factor. (Author)

DESCRIPTORS: (U) *SEQUENTIAL ANALYSIS, *SCHEDULING, COMPUTATIONS, DECOMPOSITION, CLINICAL MEDICINE, APPROXIMATION(MATHEMATICS), OPTIMIZATION, INDEXES

IDENTIFIERS: (U) *Multi armed bandit problem

AD-A170 802 9/2

DUKE UNIV DURHAM NC DEPT OF COMPUTER SCIENCE

(U) Search Algorithms and Their Implementation.

DESCRIPTIVE NOTE: Annual rep., 1 Jul 84-30 Jun 85,

AUG 85 20P

PERSONAL AUTHORS: Loveland,D. W. ;

CONTRACT NO. AFOSR-83-0205

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR
TR-86-0530

UNCLASSIFIED REPORT

ABSTRACT: (U) Papers completed this year include (1) correcting natural language input using expectations, (2) fast algorithms for finding some boundary sets of binary monotone set functions, and (3) a review of automatic programming techniques. Work on search with limited resources and a study of automating rule strength determination for rule-based systems should be completed this coming year. Work continues on approximation algorithms for the test-and-treatment problem and a new effort is underway in learning mechanisms with a focus on a method for comparing learning mechanisms that has already yielded a promising new learning strategy.

DESCRIPTORS: (U) *SEARCHING, *ALGORITHMS, NATURAL LANGUAGE, INPUT, MONOTONE FUNCTIONS, AUTOMATIC PROGRAMMING, ARTIFICIAL INTELLIGENCE

IDENTIFIERS: (U) Expert systems, WUAFOSR2304A7, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 801 6/5 12/1

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF APPLIED MATHEMATICS AND STATISTICS

(U) Computing Optimal Sequential Allocation Rules in Clinical Trials.

DESCRIPTIVE NOTE: Research rept. Jul 84-Sep 85,

SEP 85 13P

PERSONAL AUTHORS: Katehakis,Michael N ;Derman,Cyrus ;

REPORT NO AMS-85-59

CONYRACT NO. AFOSR-84-0136

PROJECT NO 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0521

UNCLASSIFIED REPORT

ABSTRACT: (U) The problem of assigning one of several treatments in clinical trials is formulated as a discounted bandit problem that was studied by Gittins and Jones. The problem involves comparison of certain state dependent indices. A recent characterization of the index is used to calculate more efficiently the values of these indices. (Author)

DESCRIPTORS: (U) *MEDICAL SERVICES, *COMPUTATIONS, *CLINICAL MEDICINE, INDEXES, ALLOCATIONS, OPTIMIZATION, BAYES THEOREM, TABLES(DATA), DYNAMIC PROGRAMMING, STATISTICAL ANALYSIS

AD-A170 801

AD-A170 800 11/6

CORNELL UNIV ITHACA NY DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Mechanistic Understanding of Powder Compaction in Metals.

DESCRIPTIVE NOTE: Annual technical rept. 1 Apr 84-15 Feb 86,

MAR 86 37P

PERSONAL AUTHORS: Raj,Rishi ;

CONTRACT NO. AFOSR-84-0133

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR
TR-86-0505

UNCLASSIFIED REPORT

ABSTRACT: (U) In this, the first annual report, results from hot-pressing experiments on NixAl(1-x) powders are described. The stoichiometry of the alloy is varied in the range 0.64<x<0.52. The change in composition allows us to change the diffusion coefficient by nearly two orders of magnitude. The principal mechanisms of powder compaction are plastic flow (by dislocations) and diffusional transport. The relative contribution of these two mechanisms can, therefore, be separated by varying the composition. Also, the dislocation mechanism is expected to dominate when densification is carried out at high stresses. Dislocation activity is also expected to influence microstructure evolution by dynamic recrystallization. The results described in this report demonstrate that the diffusional and dislocation mechanisms can indeed be separated by changing the stress and the composition. At high stresses, we have found evidence of precipitation of new grains at interfaces. Current and future work is being directed toward understanding the role of shear strain in densification and in microstructure evolution during powder compaction. (Author)

DESCRIPTORS: (U) *POWDER METALS, *HOT PRESSING, NICKEL,

AD-A170 800

AD-A170 800 CONTINUED

ALUMINUM, COATING, DENSITY

IDENTIFIERS: (U) Densification, MUAFOSR2308A1

AD-A170 797 7/4

OPTICAL SOCIETY OF AMERICA WASHINGTON D C

(U) Proceedings of the Topical Meeting on the Microphysics of Surfaces, Beams, and Adsorbates Held in Santa Fe, New Mexico on 4-6 February 1985.

DESCRIPTIVE NOTE: Final rept. 1 Nov 84-18 Dec 85,

DEC 85 208P

PERSONAL AUTHORS: Quinn,Jarus M. ;

CONTRACT NO. AFOSR-85-0018

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
TR-86-0469

UNCLASSIFIED REPORT

ABSTRACT: (U) The Topical Meeting on Microphysics of Surfaces, Beams, and Adsorbates was organized within the interdisciplinary area of molecule/surface interactions induced, or studied, by laser and ion beam techniques. Especially emphasized was the molecular physics and electro magnetism of beam activated chemical reactions for applications in fabrication of semiconductor devices, in photocatalysis, and in optical recording. Emphasis was on the laser spectroscopy or molecular collision and reaction processes on surfaces, new sensitive or high resolution spectroscopies for studies of adsorbates, and optical methods applied to surface characterization.

DESCRIPTORS: (U) *SURFACE CHEMISTRY, *MOLECULAR BEAMS, *ADSORBATES, ETCHING, SILICON, SPUTTERING, HALOGENS, ION BOMBARDMENT, EPITAXIAL GROWTH, CADMIUM TELLURIDES, MERCURY COMPOUNDS, VAPOR PHASES, CARBON MONOXIDE, STARK EFFECT, CHLORINE, SYMPOSIA, TRIMETHYLALUMINUM

IDENTIFIERS: (U) LITD(Laser Induced Thermal Desorption), Spectroelectrochemisty, Cadmium mercury tellurides, Second harmonic generation, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 782 20/8 20/5 14/5

BATTELLE COLUMBUS DIV OH

(U) Laser Produced X-Ray for High Resolution Lithography and a Photoionization Laser.

DESCRIPTIVE NOTE: Final rept.,

FEB 83 83P

PERSONAL AUTHORS: Epstein,Harold ;Applebaum,Dave ; Campbell Bernard ;

CONTRACT NO. AFOSR-82-0066

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR TR-86-0553

UNCLASSIFIED REPORT

ABSTRACT: (U) The majority of the project was spent investigating laser produced x rays for high resolution lithography. This work involved measurements over an extensive parameter matrix. Specifically, efficiency of conversions to x rays was qualified as a function of (1) laser pulse energy, (2) laser pulse width, (3) plasma profile, (4) laser wavelength, (5) target atomic number, (6) initial focal area, and (7) focal ratio of the lens. Experimental research was performed on a photoionization x ray laser concept. Specifically, a thin polyethylene, oxidicarbonate film was vaporized. Fifteen nanoseconds into its expansion, the vapor was illuminated by a 200 psec Fe spectrum x ray pulse. Photoionization of the inner K shell of oxygen was then observed. The potential efficiency of this type of laser was found to be comparatively low.

DESCRIPTORS: (U) *X RAY APPARATUS, *LASER PUMPING, *PHOTOLITHOGRAPHY, X RAYS, PHOTOIONIZATION, TRANSPARENCY, FOILS(MATERIALS), BERYLLIUM

IDENTIFIERS: (U) Laser produced x rays, PE61102F, WUAFOSR2301A8

AD-A170 782

AD-A170 779 6/16

MICHIGAN UNIV ANN ARBOR

(U) High-Resolution Analysis of Eye Movements.

DESCRIPTIVE NOTE: Final rept. 15 Jun 83-15 Nov 84,

APR 86 12P

PERSONAL AUTHORS: Jonides,John ;

CONTRACT NO. AFOSR-83-0269

PROJECT NO. 2917

TASK NO. A4

MONITOR: AFOSR TR-86-0512

UNCLASSIFIED REPORT

ABSTRACT: (U) A computerized laboratory was constructed to monitor eye movements, to present visual stimuli, and to collect and record the performance of human subjects in information processing tasks. (Author)

DESCRIPTORS: (U) *EYE MOVEMENTS, COMPUTER APPLICATIONS, MONITORING, HIGH RESOLUTION, PERFORMANCE(HUMAN), DATA ACQUISITION, STIMULI, INFORMATION PROCESSING

IDENTIFIERS: (U) WUAFOSR2917A4, PE61102F

AD-A170 779

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 778 12/2

GEORGIA IN[illegible]F TECH ATLANTA SCHOOL OF INDUSTRIAL AND SYSTEMS E[illegible]ERING

(U) Stochas[illegible] Bounds on Distributions of Optimal Value Functio[illegible]ith Applications to Pert, Network Flows and Reliabi[illegible]y.

JUL 85 31P

PERSONAL AUTH[illegible]S: Weiss,Gideon ;

REPORT NO. GIT-J-85-10

CONTRACT NO. AFOSR-84-0367

PROJECT NO. 2304

TASK NO. A5

MONITOR: AF[illegible]R
TR-86-0542

UNCLASSIFIED REPORT

ABSTRACT: (U) Meilijson and Nadas (1979) have obtained stochastic [illegible]unds in the convex majorisation sense to the critical p[illegible] length of a project network with random activity d[illegible]tions. This paper presents those results in a more ge[illegible]al framework and, using similar techniques, obtain bou[illegible] for shortest route, maximal flow and reliability system lifetime. (Author)

DESCRIPTORS: (U) *OPERATIONS RESEARCH, *STOCHASTIC PROCESSES, PATHS, CRITICALITY(GENERAL), LENGTH, RELIABILITY, PERT, NETWORK FLOWS, ROUTING

IDENTIFIERS: (U) *Stochastic bounds, WUAFOSR2304A5, PE61102F

AD-A170 778

AD-A170 772 9/5 20/12

PURDUE UNIV LAFAYETTE IN SCHOOL OF ELECTRICAL ENGINEERING

(U) Investigation of a New Concept in Semiconductor Microwave Oscillators.

DESCRIPTIVE NOTE: Annual rept. 1 May 85-30 Apr 86,

MAY 86 32P

PERSONAL AUTHORS: Cooper,James A. , Jr;

CONTRACT NO. AFOSR-85-0193

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR
TR-86-0527

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

ABSTRACT: (U) The goal of this research is to fabricate and characterize a new type of semiconductor device known as a contiguous-domain transferred oscillator. This device differs from existing semiconductor oscillators in several fundamental ways, and should be capable of direct electronic tuning in the range from a few gigahertz to a few hundred gigahertz. During the first year of this project, test chips were designed, masks were made, and a processing schedule was worked out. Three aspects of the processing required special attention: implant activation, resistive gate formation, and silicon nitride deposition. Uncapped flash annealing was used for implant activation, and satisfactory results were achieved.

DESCRIPTORS: (U) *MICROWAVE OSCILLATORS, *SEMICONDUCTORS, ELECTRODES, TUNING DEVICES, CHIPS(ELECTRONICS), GATES(CIRCUITS), SILICON COMPOUNDS, NITRIDES, ION BEAMS, THIN FILMS, NICKEL, MANGANESE, CHROMIUM, GALLIUM ARSENIDES, WAFERS, TRANSPARENCIES, ETCHING, FABRICATION, ALLOYS

IDENTIFIERS: (U) CDTO(Contiguous Domain Transferred Oscillators), Resistive gates, Silicon nitrides, Buried

AD-A170 772

AD-A170 772 CONTINUED

Channels, Flash annealing, Implant activation, Electrodes(Gate), Draw electrodes, WUAFOSR2305C1, PLBIIC.F, Source Electrodes

AD-A170 771 20/3 20/8

PANAMETRICS INC WALTHAM MASS

(U) Absorption and Scattering by Conductive Fibers: Basic Theory and Comparison with Asymptotic Results.

DESCRIPTIVE NOTE: Annual rept. May 84-Sep 85,

OCT 85 68P

PERSONAL AUTHORS: Pedersen,N. E. ;Pedersen,J. C. ; Waterman,P. C. ;

CONTRACT NO.: F49620-84-C-0045

PROJECT NO. 2306

TASK NO. C4

MONITOR: AFOSR TR-86-0516

UNCLASSIFIED REPORT

ABSTRACT: (U) A theory based on the variational method, along with associated computer codes, has been developed for analyzing the electromagnetic scattering and absorption from thin conductive fibers of arbitrary size, conductivity and orientation. Extensions and refinements of this theory have now been completed and programmed. A summary is given of the basic equations used in the variational computation for arbitrary fibers. The quasistatic model appropriate at long wavelengths is then derived, followed by the infinite cylinder computation which should be accurate for wavelengths short compared with cylinder length. In order that the computations may be extended into the infrared and visible regimes, it is necessary to incorporate the optical properties of the fibers. Curved fibers are considered in this report. An exact integral equation is derived for the general case, and some approximate results are then given for special fibers. Also discussed are the optimum conditions for target obscuration by a cloud of particles from a mass efficiency standpoint. Particle optimization studies are performed under varying requirements on absorption, reflection and transparency of the particle cloud.

DESCRIPTORS: (U) *ELECTROMAGNETIC SCATTERING, *FIBERS, *OBSCURATION, THINNESS, ELECTRIC CONDUCTORS, RADIATION

AD-A170 771 CONTINUED

ABSORP[illegible]N, MICROWAVES, INFRARED SPECTRA, OPTICAL
PROPE[illegible]S, INTEGRAL EQUATIONS, TRANSPARENCE, VARIATIONAL
METHO[illegible]COMPUTERIZED SIMULATION, METAL FIBERS,
LEAD([illegible]), COPPER

IDENTIFIERS: (U) Drude model, WUAFOSR2306C4, PE61102F

AD-A170 765 12/1 12/2

ILLINOIS UNIV AT CHICAGO CIRCLE DEPT OF MATHEMATICS STATISTICS AND COMPUTER SCIENCE

(U) Optimal Step Type Designs for Comparing Test Treatments with a Control.

DESCRIPTIVE NOTE: Interim rept.,

JUN 86 18P

PERSONAL AUTHORS: Cheng,C. S. ;Majumdar,D. ;Stufken,J. ; Ture,T. E. ;

REPORT NO. TR-86-03

CONTRACT NO. AFOSR-85-0320, AFOSR-80-0170

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0577

UNCLASSIFIED REPORT

ABSTRACT: (U) The problem of obtaining A optimal designs for comparing v test treatments with a control in b blocks of size k each is considered. A step type design is a BTIB design in which the control is replicated t times in some blocks and t + 1 times in the remaining blocks. A condition on the parameters (v,b,k) is identified for which optimal step type designs can be obtained. Families of such designs are given. Methods for searching for highly efficient designs are proposed, for situations where it is difficult to determine an A optimal design.

DESCRIPTORS: (U) *CONTROL THEORY, *SYSTEMS ENGINEERING, EXPERIMENTAL DESIGN, OPTIMIZATION, MATRICES(MATHEMATICS)

IDENTIFIERS: (U) *Block design, Homoscedasticity, BTIB(Balanced Treatment Incomplete Block), WUAFOSR2304A5, PE61102F

AD-A170 764 8/13

NORTH C[illegible]LINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESS[illegible]

(U) Rece[illegible] Developments in Probabilistic Geotechnical Engi[illegible]ring

DESCRIPTIVE NOTE: Rept. for Nov 83 Aug 84.

DEC 83 9P

PERSONAL AUTHORS: Hasofer,A. M. ;

REPORT NO TR-40

CONTRACT NO: F49620-85-C-0144

PROJECT NO 2304

TASK NO. A5

MONITOR: AFOSR
TR 86-0800

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Proceedings of the Interna[illegible]al Symposium on Recent Developments in Laborat[illegible], and Field Tests and Analysis of Geotechnical Problem[illegible] Sp 1983.

ABSTRACT: (U) New and extended work in some areas of probabil[illegible]stic geotechnical engineering are presented in a largely [illegible]technical fashion. The areas covered are the follow[illegible] Measuring soil properties, including geostat[illegible]ics, graphical analysis, choice of estimators, factor [illegible]alysis and updating parameter distributions; Markov [illegible]esses, including micro-macro models and progres[illegible]e slope failure; Probabilistic design with special[illegible]erence to Level II design methods and slope stabil[illegible]. (Author)

DESCRIPT[illegible] (U) *SOIL MECHANICS, *MATHEMATICAL MODELS, SYMPOSIA, PROBABILITY, SLOPE, STABILITY, REPRINTS

IDENTIFIE[illegible] (U) *Geotechnical engineering, WUAFOSR[illegible]4A5, PE61102F

AD-A170 763 7/3 11/10 11/9

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) The Polysilane High Polymers.

86 21P

PERSONAL AUTHORS: West,Robert ;

CONTRACT NO. F49620-83-C-0044

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-86-0585

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organometallic Chemistry, v300 p327-348 1986.

ABSTRACT: (U) A review of the published literature of organopolysilane high polymers, including history, synthesis, electronic properties, photochemistry, chemical and crosslinking reactions. The technological applications of polysilanes as precursors to silicon carbide, as photoresists for microelectronics and as photoinitiators for vinyl polymerization are also covered.

DESCRIPTORS: (U) *POLYSILANES, ORGANIC CHEMISTRY, POLYMERS, PHOTOCHEMICAL REACTIONS, SYNTHESIS(CHEMISTRY), CROSSLINKING(CHEMISTRY), RADIATION ABSORPTION, ULTRAVIOLET RADIATION, SILICON CARBIDES, VINYL PLASTICS, REPRINTS

IDENTIFIERS: (U) Organopoly silanes, Polysilane/alkenyl, WUAFOSR230382, PE61102F

AD-A170 781 8/8 3/2 12/1

NORTH CAROL A UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) A Stoch tic Process That is Autoregressive in Two Directi of Time.

DESCRIPTIVE N E: Technical rept. Nov 83 Aug 84.

86 8P

PERSONAL AUTH S: DEHaan,L. ;

REPORT NO. T 8

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2 04

TASK NO. A5

MONITOR: A R
TR 3-0593

UNCLASSIFIED REPORT

SUPPLEMENTARY TE: Pub. in Statistica Neerlandica, v40 n1 p39-45 1

ABSTRACT: (U) A continuous time stationary process is discussed t t is maxautoregressive in one direction of time and s autoregressive in the order direction. A discrete t version of the process was discussed in Chernick ( ). A related continuous time process is discussed weiss (1980).

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, *MATHEMATICAL MODELS, *W R FLOW, *SOLAR ENERGY, RIVERS, ENERGY STORAGE, O R STATISTICS, REPRINTS

IDENTIFIERS: (U) *Autoregressive processes, WUAFOSR2304 5, PE61102F

AD-A170 781

AD-A170 758 5/10

YALE UNIV NEW HAVEN CT DEPT OF OPHTHALMOLOGY AND VISUAL SCIENCE

(U) A Model for the Processing of Position Information in the Human Visual System.

DESCRIPTIVE NOTE: Technical rept.,

SEP 83 41P

PERSONAL AUTHORS: Hirsch,Joy ;Hylton,Ron ;

REPORT NO. TR-8304

CONTRACT NO. F49620-83-C-0028

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-86-0540

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Columbia Univ. Dept. of Physics., New York, NY.

ABSTRACT: (U) We present a model for the processing of positional information in the human visual system, with particular emphasis on visual tasks that involve the measurement of spatial separation. The model is in many respects a radical departure from current thinking about problems in vision. Of particular note is the fundamental significance we attach to the retinal photoreceptor lattice, considered as a two-dimensional spatial sampling system. Mechanisms of neural interpolation are discussed and hyperacuity is a natural consequence of the model. Major concerns which we do not address are questions of temporal dependence and the integration of binocular information. We refer to the model as the scaled lattice model.

DESCRIPTORS: (U) *VISION, *INFORMATION PROCESSING, POSITION(LOCATION), SPACE(ROOM), MODELS

IDENTIFIERS: (U) Scaled lattice model, PE61102F, WUAFOSR2313A5

AD-A170 758

AD-A170 755 5/10 6/18

YALE UNIV NEW HAVEN CT DEPT OF OPHTHALMOLOGY AND VISUAL SCIENCE

(U) Limits of Pattern Discrimination in Human Vision.

DESCRIPTIVE NOTE: Final rept. Jan 83-Dec 85.

FEB 86 30P

PERSONAL AUTHORS: Hirsch,Joy ;

CONTRACT NO. F49620-83-C-0026

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-88-0589

UNCLASSIFIED REPORT

ABSTRACT: (U) This investigation was focused on identification of various limits of human spatial discrimination, two-dimensional sampling properties of the retinal photoreceptor lattice, and the consequences for spatial vision. Highlights from this study are briefly listed. 1) Foveal Spatial Discriminations are hyperacuity tasks; 2) The spatial-frequency discrimination function (delta f/f vs f) is segmented; 3) The discrimination segments can be related to retinal sampling; 4) Scaling mechanisms apply to low resolution tasks; 5) The photoreceptor lattice is a highly ordered hexagonal array; 6) A hexagonal component exists in spatial discrimination; 7) A new 'metric' model of spatial vision is based on visual sampling.

DESCRIPTORS: (U) *VISUAL PERCEPTION, *DISCRIMINATION, PATTERNS, RETINA, PHOTORECEPTORS, TWO DIMENSIONAL, SAMPLING, FOVEA, LOW RESOLUTION

IDENTIFIERS: (U) Spatial vision, Hyperacuity, Webers law, PE1102F, WUAFOSR2313A5

AD-A170 755

AD-A170 755 6/1 5/10 6/18

TEXAS UNIV HEALTH SCIENCE CENTER AT DALLAS DEPT OF CELL BIOLOGY AND ANATOMY

(U) The Role of Central Monoaminergic Systems in Arousal and Selective Attention.

DESCRIPTIVE NOTE: Annual rept. 1 Mar 85-28 Feb 86.

MAR 86 9P

PERSONAL AUTHORS: Waterhouse,Barry D. ;

CONTRACT NO. AFOSR-85-0138

PROJECT NO. 2312

TASK NO. A3

MONITOR: AFOSR
TR-88-0414

UNCLASSIFIED REPORT

ABSTRACT: (U) The work described here is part of an ongoing set of studies aimed at characterizing the physiological actions and anatomical organization of the monoaminergic projection systems to the rat cerebral cortex, cerebellum and hypothalmus. The underlying theme of this work is that the endogenous monoamines, norepinephrine (NE) and serotonin (5-HT), serve to modulate central neuronal responsiveness to afferent synaptic inputs and by so doing participate in the cognitive process of selective attention. Specifically, individual studies describe: 1) the effects of NE and 5-HT on rat visula and somatosensory cortical neuron responses to afferant pathway stimulation, 2) topographic organization of the neocortical projection neurons in the serotonergic dorsal raphe nucleus, 3) pharmacological characterization of NE effects in rat lateral hypothalamus and 4) similarity between the modulatory actions of NE and stimulant drugs, cocaine and amphetamine. Overall, the data provide further support for the contention that the diffusely distributed monoamine systems of the mammalian brain may enhance the performance of target neuronal circuits as a function of changing behavioral conditions.

DESCRIPTORS: (U) *CENTRAL NERVOUS SYSTEM, *AWARENESS,

AD-A170 755

AD-A170 75[illegible] CONTINUED

ATTENTI •AMINES, •NEUROCHEMICAL TRANSMISSION, CEREBRAL CORTEX, CEREBELLUM, HYPOTHALAMUS, SEROTONIN, SYNAPSE, COGNIT: VISUAL CORTEX, NERVE CELLS, RESPONSE(BIOLOGY), STIMULA[illegible]N(PHYSIOLOGY), PHARMACOLOGY, RATS

IDENTIFI (U) •Monoamines, Norephinephrine, PE61102F, WUAFOS[illegible]2A3

AD-A170 751 8/11

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF GEOLOGY AND GEOPHYSICS

(U) Relationship between Near-Field and Teleseismic Observations of Seismic Source Parameters.

DESCRIPTIVE NOTE: Final rept. 1 Feb 83-31 May 85,

MAY 85 286P

PERSONAL AUTHORS: Alexander,Shelton S. ;

CONTRACT NO. AFOSR-82-0054, ARPA Order-4397

PROJECT NO. 2309

TASK NO. A2

MONITOR: AFOSR TR-86-0554

UNCLASSIFIED REPORT

ABSTRACT: (U) Contents: (1) Estimates of Source and Path Characteristics in the USSR and North America Using Short Period (Lg) and Long-Period Surface Wave Dispersion and Spectral Excitation; (2) Analysis of the New Brunswick, 1982, Earthquake Sequence with Inferences on Source Parameters from Multi-Mode Surface Wave Dispersion and Spectral Excitation (M.S. Thesis of C. Nichols).

DESCRIPTORS: (U) •SEISMIC WAVES, •EARTHQUAKES, USSR, NORTH AMERICA, SOURCES, PATHS, SURFACE WAVES, SCATTERING, EXCITATION, SPECTRA, NEW BRUNSWICK, MULTIMODE, WAVE PROPAGATION, THESES

IDENTIFIERS: (U) Seismic sources, PE61102F, WUAFOSR2309A2

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 750 20/8 11/2 7/2

CORNING GLASS WORKS NY

(U) Fluoride Glasses for Bulk Optical and Waveguide Applications.

DESCRIPTIVE NOTE: Final rept. 15 Aug 84-14 Aug 85,

JAN 86 21P

PERSONAL AUTHORS: Tick,P. A. ;

CONTRACT NO. F49620-84-C-0088

PROJECT NO. 2303

TASK NO. A3

MONITOR. AFOSR TR-86-0570

UNCLASSIFIED REPORT

ABSTRACT: (U) The overall goal of the research was to develop a wide transmission window heavy metal fluoride glass (HMFG) which could eventually be compatible with chemical vapor deposition (CVD) forming. During the first two years of contract work, a new composition field, i.e., CLAP (2 LiF.AlF3.PbF2) glasses, were identified and the basic chemistry and properties of the system determined. Since the intent of the work is to use such glasses for bulk IR optics or for ultra-low-loss OWG fibers, further characterization was required. It remained to establish the utility of these glasses as practical infrared transmitting materials. This required that a method for removing water be found and that the effects of infrared absorbing impurities be determined. Work in these two areas constituted much of the recent effort.

DESCRIPTORS: (U) *OPTICAL GLASS, *INFRARED EQUIPMENT, *FLUORIDES, CADMIUM COMPOUNDS, LITHIUM COMPOUNDS, ALUMINUM COMPOUNDS, LEAD COMPOUNDS, SALTS, WATER

IDENTIFIERS: (U) HMFG(Heavy Metal Fluoride Glass), CLAP(Calcium Lithium Aluminum Lead), Heavy metals, Zirconates, PE61102F

AD-A170 750

AD-A170 739 8/3

MISSOURI UNIV-ST LOUIS DEPT OF PHYSICS

(U) Quantum 1/f Noise in Submicron Devices and Quartz Resonators.

DESCRIPTIVE NOTE: Final technical rept. 15 Jul 84-14 Jul 85,

OCT 85 28P

PERSONAL AUTHORS: Handel,Peter H. ;

CONTRACT NO. AFOSR-84-0228

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR TR-86-0550

UNCLASSIFIED REPORT

ABSTRACT: (U) The work performed under this grant has allowed for the first time a unitified description of 1/f noise in the mobility, the surface and bulk recombination speed, the injection, emission, trapping and tunneling processes in submicron devices and quartz resonators and surface accoustic wave devices. All noise sources mentioned above have been expressed in terms of a fundamental formula which in essence equates the spectral density of fractional cross section fluctuations (e.g. scattering cross sections which determine the frequency of collisions, the relaxation time and the mobility) with the quadratic carrier velocity change in units of the speed of light, for the process considered, multiplied by the fine structure constant 1/137. The applications to various submicron devices such as HEMT, HJT, n(+)p diodes, photodetectors have given a good fit to experimental data without free parameters.

DESCRIPTORS: (U) *QUANTUM ELECTRONICS, *NOISE(ELECTRICAL AND ELECTROMAGNETIC), QUARTZ RESONATORS, SURFACE ACOUSTIC WAVE DEVICES, CARRIER MOBILITY, TRAPPING(CHARGED PARTICLES), TUNNELING(ELECTRONICS), SCATTERING CROSS SECTIONS, FIELD EFFECT TRANSISTORS

IDENTIFIERS: (U) Hooge parameters, WUAFOSR2305C1,

AD-A170 739

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 739 CONTINUED

PE61102F

AD-A170 699 9/2

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

(U) Parallel Matrix Computations.

DESCRIPTIVE NOTE: Interim rept. Apr 85-Apr 86,

MAY 86 12P

PERSONAL AUTHORS: Stewart,G. W. ;O'Leary,Dianne P. ;

CONTRACT NO. AFOSR-82-0078

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-86-0548

UNCLASSIFIED REPORT

ABSTRACT: (U) This project concerns the design and analysis of algorithms to be run in a processor-rich environment. The authors focus primarily on algorithms that requires no global control and that can be run on systems with only local connections among processors. They investigate the properties of these algorithms both theoretically and experimentally. The experimental work is done on the ZMOB, a working parallel computer operated by the Laboratory for Parallel Computation of the Computer Science Department at the University of Maryland. To give this work direction, they focused on two areas: Dense problems from numerical linear algebra; and The iterative and direct solution of sparse linear systems. (Author)

DESCRIPTORS: (U) *ALGORITHMS, COMPUTATIONS, PARALLEL PROCESSING, LINEAR ALGEBRA, LINEAR SYSTEMS, SPARSE MATRIX, BIBLIOGRAPHIES, REPORTS, ABSTRACTS

IDENTIFIERS: (U) MUAFOSR2304A3, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 6 · 11/8

DREXEL ·V PHILADELPHIA PA DEPT OF MATERIALS
ENGINE· ·d

(U) A F· ·ental Study of P/M Processed Elevated Tem· ·ture Aluminum Alloys.

DESCRIPTI·· NOTE: Annual technical rept. 1 Oct 83-30 Sep 84.

OCT 84 27P

PERSONAL A· ·HORS: Lawley,A. ;Koczak,M. J ;

CONTRACT ·· AFOSR-82-0010

PROJECT N· 2306

TASK NO. A1

MONITOR: AFOSR
TR-86-0566

UNCLASSIFIED REPORT

ABSTRACT (U) Elevated temperature tensile and creep proper· · of powder metallurgy Al-Fe-Ni alloys with FeNiAl· · ·spersoid volume fractions of 0.19, 0.25 and 0. 32 are ·· ·g examined with respect to processing mode, micros· ·ture and microstructural stability. The overall objec· · ·s to establish a basic understanding of proces· ·y microstructure relations in this new class of alloys · order to provide design guidelines with respect to lif· · in service stresses and temperature. Tests have been c· ·ted at temperatures up to 400 C. Ambient temper· · e strengthening can be explained by the Orowan dislo· ·n bowing model. Yield strength decreases with increa· · temperature and above 300 C, it is independent of dis· ·id size and dispersoid volume fraction. Steady state · ·) rate is independent of the dispersoid volume fracti· ·er the temperature range 250 C - 400 C, and the a· ·· stress exponent is 10 with a creep activation energy · 76 Kcal/mole. Elevated temperature deformation is co· ·ent with a cooperative dislocation climb mecha· ·which is insensitive to dispersoid size and disper· · volume fraction. The data and observations confir· · benefits of a dual powder metallurgy/rapid solidi· ·tion approach with respect to enhanced micros· ·tural stability at elevated temperatures.

AD-A170 6 ·

AD-A170 898

AD-A170 898 CONTINUED

Similar studies have been initiated in which a mechanical alloying step is introduced prior to powder consolidation. (Author)

DESCRIPTORS: (U) *ALUMINUM ALLOYS, *HIGH TEMPERATURE, CREEP, TENSILE PROPERTIES, YIELD STRENGTH, POWDER METALLURGY, MICROSTRUCTURE

IDENTIFIERS: (U) MUAFOSR2306A1, TE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 697 11/6

DREXEL (N) PHILADELPHIA PA DEPT OF MATERIALS ENGINEERI

(U) A Fund tal Study of P/M Processed Elevated Tempera e Aluminum Alloys.

DESCRIPTIVE NOTE: Annual technical rept. 1 Oct 84-30 Sep 85.

OCT 85 28P

PERSONAL AUTHORS: Lawley,A. ;Koczak,M. J. ;

CONTRACT NO. AFOSR-82-0010

PROJECT NO. 2306

TASK NO. A1

MONITOR: A R
Te 83-0587

UNCLASSIFIED REPORT

ABSTRACT: (U) The ambient and elevated temperature strength a microstructural stability of powder processed Fe-Ni alloys are being evaluated with respect to essing mode, microstructure, and microstruc al stability. The overall objective is to establish a asic understanding of processing-microstruc relations in this new class of alloys in order to e lish design guidelines for limiting stresses a temperatures. In the current program year, rapidly so ified p-ealloyed powder containing 0.19 volume fra of FeNiAl9 dispersoid (similar to 0.18 micromater as mechanically alloyed (MA) and subsequent ot extruded to full density. The MA alloy is stronge than the non MA alloy at temperatures up to about 300 In addition, MA enhances microstructural stability a elevated temperature; for example there is no signifi t coarsening of the FeNiAl9 after 624 hours at 450 C. provements in alloy strength and stability are attrib d to the presence of fine scale (similar to 30 nm) ox and carbides introduced during MA, and which are tributed uniformly throughout the matrix, at matrix- in tallic interfaces, and on sungrain boundaries his fine-scale dispersoid provides effective resistance to dislocation bowing (Orowan mechanism) below

AD-A170 697

AD-A170 697 CONTINUED

300 C. At higher temperatures, dislocation climb is the controlling mechanism and the small oxides/carbides are no longer effective barriers to climb. Processing mode does not significantly alter the as-extruded microstructure, but it does influence strength and strength retention. A combination of low degassing and extrusion temperatures results in superiority with respect to strength and stability.

DESCRIPTORS: (U) *ALUMINUM ALLOYS, *HIGH TEMPERATURE, IRON ALLOYS, NICKEL ALLOYS, MICROSTRUCTURE, HARDNESS, POWDER METALLURGY, MECHANICAL PROPERTIES

IDENTIFIERS: (U) WUAFOSR2306A1, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 [illegible] 20/12

ARIZONA STATE UNIV TEMPE CENTER FOR SOLID STATE ELECTRONICS RESEARCH

(U) Theoretical Studies of Experiments and Applications of Subpicosecond Photoconductivity.

DESCRIPTIVE NOTE: Annual technical rept. no. 1, 1 Sep 84-31 Aug 85

JUN 85 99P

PERSONAL AUTHORS: Grondin,Robert O. ;

CONTRACT NO. AFOSR-84-0280

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR TR-88-0582

UNCLASSIFIED REPORT

ABSTRACT: (U) During the reporting period, the first year of a two year program, progress was made on the development of models of femtosecond photoconductive experiments as used as probes of hot carrier transport in semiconductors. In these experiments subpicosecond laser pulses are focused onto a gap in a transmission line with a semiconducting substrate. A voltage wave is then propagated down the line as a result of the photoconductive transient in the gap. During this first year we developed models for the description of the carrier photogeneration process and the ensuing photocurrent transient. Monte Carlo methods were used in both of these models.

DESCRIPTORS: (U) *SEMICONDUCTOR DEVICES, *PHOTOCONDUCTIVITY, *ELECTRONIC SWITCHING, TRANSPORT PROPERTIES, TRANSIENTS, QUICK REACTION, ELECTRON GAS, HOLES (ELECTRON DEFICIENCIES), LIGHT PULSES, GALLIUM ARSENIDES, MONTE CARLO METHOD

IDENTIFIERS: (U) Femtosecond time, Microstrip transmission lines, WUAFOSR2305C1, PE81102F

AD-A170 693

AD-A170 691 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Measures of Dependence for Evaluating Information in Censored Models

DESCRIPTIVE NOTE: Technical rept.

JUL 88 22P

PERSONAL AUTHORS: Hollander,Myles ;Proschan,Frank ; Sconing,James ;

REPORT NO. FSU-STATISTICS-M706, TR-85-180-AFOSR

CONTRACT NO. F49620-85-C-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0547

UNCLASSIFIED REPORT

ABSTRACT: (U) Measures of information in censored models are developed by adapting measures of dependence between the lifetime variable and the observed variable. Some common notions of bivariate dependence and coefficients of divergence are used to derive these classes of measures. It is shown that most of the measures of bivariate dependence have the fundamental property that as censoring decreases stochastically, the information increases. An exception occurs when dependence is defined in terms of association. Conditions under which the coefficients of divergence enjoy the fundamental property are established. (Author)

DESCRIPTORS: (U) *BIVARIATE ANALYSIS, *MATHEMATICAL MODELS, PROBABILITY DISTRIBUTION FUNCTIONS, PROBABILITY DENSITY FUNCTIONS, RANDOM VARIABLES, COEFFICIENTS, CENSORSHIP

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F

AD-A170 691

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 657 12/1

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Research in Adaptive and Decentralized Stochastic Control.

DESCRIPTIVE NOTE: Interim rept. 15 Mar 84-14 Mar 85,

MAY 85 12P

PERSONAL AUTHORS: Marcus,Steven I. ;

CONTRACT NO. AFOSR-84-0089

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-85-0549

UNCLASSIFIED REPORT

ABSTRACT: (U) Significant progress was made in a number of aspects of stochastic systems. The problem of adaptive control of priority assignment in queueing systems was solved. A distance-measures approach to the problem of approximation and identification of queueing systems was studied. A problem of adaptively controlling a discounted-reward finite state Markov decision process was solved. Major new results were obtained for the problem of adaptive control with incomplete observations. In particular we have studied in depth a problem of adaptive control with incomplete observations, in which the state is a finite state Markov process. (Author)

DESCRIPTORS: (U) *STOCHASTIC CONTROL, *ADAPTIVE CONTROL SYSTEMS, PROBABILITY, SOLVING, APPROXIMATION(MATHEMATICS), DECENTRALIZATION, OBSERVATION

IDENTIFIERS: (U) QUEUEING SYSTEMS, PE61102F

AD-A170 653 13/8 20/2 20/6

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Lasar Physics and Laser Spectroscopy.

DESCRIPTIVE NOTE: Final rept. 15 Feb 84-14 Feb 85,

MAR 86. 46P

PERSONAL AUTHORS: Byer,Robert L. ;

CONTRACT NO. F49620-84-C-C021

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR TR-86-0588

UNCLASSIFIED REPORT

ABSTRACT: (U) In its second year of operation, the single crystal fiber growth machine has produced over 400 fibers of a variety of materials, some of which had never before been grown in fiber form. A high speed, high resolution, long working distance diameter measurement system has been constructed and installed on the growth machine. It has enabled the closed loop growth of single crystal fibers possessing diameter stability a factor of four better than the fibers grown without feedback diameter control. The first monolithic single crystal fiber devices, a fiber ruby laser and a sapphire fiber thermometer, have been studied.

DESCRIPTORS: (U) *CRYSTAL GROWTH, *FIBER OPTICS TRANSMISSION LINES, SINGLE CRYSTALS, DRAWING(FORMING), SAPPHIRE, RUBY, YTTRIUM ALUMINUM GARNET, LITHIUM NIOBATES, FABRICATION, FIBER OPTICS, HEATING, LASER BEAMS

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A1

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 632 7/4 7/3

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) A Bent Cyclopolysilane Anion-Radical (i-Pr2Si)4.

85 5P

PERSONAL AUTHORS: Wadsworth,Cynthia L. ;West,Robert ; Nagai,Yoshiro ;Watanabe,Hamao ;Matsumoto,Hideyuki ;

CONTRACT NO. F49620-83-C-0044

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR 86-0590

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemistry Letters, p1525-1528 1985.

ABSTRACT: (U) The ESR spectra for (i-Pr2Si)4(tau) and (s-Bu2Si)4(tau) show two equally-intense splitting constants for alpha-(13)C, indicating that these anion-radicals are bent and not rapidly interconverting. Cyclopolysilanes undergo reduction to anion-radicals in which the unpaired electron is delocalized over the ring. Numerous anion-radicals of four-, five-, and six-membered ring cyclopolysilanes have been investigated by ESR spectroscopy in recent years. When these rings are of the form (R2Si)n(tau) (with all substituents R identical), in general they show only single values for the alpha-(13)C hyperfine splitting constant (hfsc), as well as for the alpha-(29)Si hfsc when it is large enough to be observed. These findings imply that such anion-radicals (R2Si)n(tau), n = 4 to 6, are either planar or rapidly interconverting on the ESR time scale. An exception to this generalization has now been observed, for octakis-(i-propyl)-cyclotetrasilane, 1.

DESCRIPTORS: (U) *SILANES, *POLYMERS, *ANIONS, *CHEMICAL RADICALS, ELECTRON SPIN RESONANCE, ELECTRON SPECTROSCOPY, CYCLIC COMPOUNDS, BENDING, SPLITTING, HYPERFINE STRUCTURE, REPRINTS

IDENTIFIERS: (U) PE61102F

AD-A170 632

AD-A170 455 12/1 14/4

ARIZONA UNIV TUCSON

(U) A Bayesian Approach to Quantile and Response Probability Estimation with Applications in Reliability.

DESCRIPTIVE NOTE: Technical rept.,

AUG 85 24P

PERSONAL AUTHORS: Shaked,Moshe ;Singpurwalla,Nozer D. ;

CONTRACT NO. AFOSR-84-0205

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0352

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with George Washington Univ., Washington, DC.

ABSTRACT: (U) This paper studies a Bayesian approach for the estimation of potency curve which is assumed to be nondecreasing and cocave. This is done by assigning a Dirichlet prior to transformations of some unknown parameters. The choice is made of the prior and investigate several aspects of the problem, such as the properties of the posterior distribution as well as a numerical implementation of the suggested procedure. A procedure for estimating the quantiles is also given. Applications in reliability theory are described. The procedure is illustrated numerically via an example from a government laboratory.

DESCRIPTORS: (U) *BAYES THEOREM, *LIFE TESTS, *MATHEMATICAL PREDICTION, RELIABILITY, POTENCY, ACCELERATED TESTING, DAMAGE ASSESSMENT, ESTIMATES, BIOASSAY, DOSIMETRY

IDENTIFIERS: (U) Dirichlet Process, Quantile estimation, PE61102F, WUAFOSR2304A5

AD-A170 455

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 430 3/1

SMITHSONIAN ASTROPHYSICAL OBSERVATORY CAMBRIDGE MA

(U) High Resolution Astrophysical Observations Using Speckle Imaging.

DESCRIPTIVE NOTE: Final rept. 1 Jan 81-31 Dec 85,

APR 88 105P

PERSONAL AUTHOR(S): Noyes,Robert W. ;Nisenson,Peter ; Papaliolios,Costas ;Stachnik,Robert V. ;

CONTRACT NO. AFOSR-81-0055

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR TR-88-0427

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes progress under a contract to develop a complete astronomical speckle image reconstruction facility and to apply that facility to the solution of astronomical problems. During the course of the contract we have developed the procedures, algorithms, theory and hardware required to perform that function and have made interpreted astronomical observations of substantial significance. A principal result of the program was development of a photon-counting camera of innovative design, the PAPA detector. Development of this device was in our view, essential to making the speckle process into a useful astronomical tool, since the principal impediment to that circumstance in the past was the necessity for application of photon noise compensation procedures which were difficult if not impossible to calibrate. The photon camera made this procedure unnecessary and permitted precision image recovery. The result of this effort and the associated algorithm development was an active program of astronomical observation which included investigations into young stellar objects, supergiant structure and measurement of the helium abundance of the early universe. We have also continued research on recovery of high angular resolution images of the solar surface working with scientists at the Sacramento Peak Observatory in this area.

AD-A170 430 CONTINUED

DESCRIPTORS: (U) *SOLAR PHYSICS, *INTERFEROMETRY, SPECULAR REFLECTION, OPTICAL IMAGES, ASTRONOMICAL CAMERAS, PHOTONS, HIGH RESOLUTION, STARS, GROWTH(GENERAL), QUANTUM EFFICIENCY, OPTICAL DETECTORS, IMAGE INTENSIFIERS(ELECTRONICS)

IDENTIFIERS: (U) Speckle interferometry, PAPA detectors, PAPA(Precision Analog Photon Address), PE61102F, WUAFOSR2311A1

AD-A170 430

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 418 5/10

DAL[illegible]IE UNIV HALIFAX (NOVA SCOTIA)

(U) V[illegible]al Sensitivities and Discriminations and Their R[illegible]s in Aviation.

DESCRIPTIVE NOTE: Interim rept. Oct 84-Sep 85.

MAR 86 42P

PERSONAL AUTHORS: Regan,David ;

CONTRACT NO. AFOSR-84-0030

PROJECT NO. 2313

TASK NO. A5

MONITOR AFOSR
TR-86-0464

UNCLASSIFIED REPORT

ABSTRACT: (U) A device has been developed (MIDAPT) that tes[illegible] a subject's ability to track a target's motion in dep[illegible] The test has been encouragingly successful in pre[illegible]ting intersubject differences of pilots' flying per[illegible]ance in high-performance jet aircraft and in sim[illegible]tors. We report evidence that human observers' acu[illegible] discrimination of differences in size (about 5%) and orientation (about 0.3 deg) is achieved by comparing the outputs of two or more neurons, each of which is sens[illegible]tive to a rather broad range of sizes and ori[illegible]ations. We suggest that the human visual pathway con[illegible]ns size-opponent and orientation-opponent mec[illegible]nisms, and that this can explain why subjects easily unc[illegible]ound orientation, size and contrast in spite of the fact that the firing of cortical neurons is affected by all [illegible]se parameters. We measured subjects' ability to det[illegible] a camouflaged object that was visible only when mov[illegible] and compared these data with similar measurements for [illegible]ventional objects that were brighter than their sur[illegible]dings. These findings may be relevant to low-level fli[illegible] for example in helicopters, where ground features may [illegible] virtually indistinguishable except when moving. Mon[illegible]ular ability to judge the direction of motion in dep[illegible]was investigated by measuring the effect of ada[illegible]tion to different directions of motion in depth for a t[illegible]get viewed with one eye. In contrast to binocular judgements of motion in depth, the results could be explained in terms of only two channels: one for frontal plane motion, and one for pure line-of-sight motion.

DESCRIPTORS: (U) *VISUAL PERCEPTION, VISION, PILOTS, *PERFORMANCE(HUMAN), AERIAL TARGETS, VISUAL TARGETS, TARGET RECOGNITION, DISCRIMINATION, SENSITIVITY, MOTION, CAMOUFLAGE, CANADA

IDENTIFIERS: (U) Visual sensitivity, Target motion, WUAFOSR2313A5, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 383 20/8

SCIENCE A: :CATIONS INTERNATIONAL CORP LOS ALTOS CA

(U) Studies :n High Current Beam Propagation at Reduced Pressu: :

DESCRIPTIVE :E. Annual rept. 15 Mar 84-30 Nov 84,

JAN 85 121P

PERSONAL AU: :S: Parkinson,E. R. ;Keeley,D. A. ;

REPORT NO. :SIC-U-75-PA

CONTRACT NO F49620-84-C-0012

PROJECT NO. 2301

TASK NO. A:

MONITOR: A: :R
T- 33-0494

UNCLASSIFIED REPORT

ABSTRACT: (Hall current effects in the redistribution of plasma :rents and possible stability enhancement in electron t :s were explored in a range of pressure regimes. : :ved e.m. algorithms and conductivity models were deve :d as part o' the studies Substantial effects w: found below a' low pressure threshold, where nonlocal e: :ts, non-Ohmic conductivity, and a highly non-Maxve: :n distribution of plasma electron energies were all :d to contribute significantly to the magnitude : Hall current phenomena. Several e m field algorithms: e developed for application to the nonlinear :-displacement regime. An iterative approach to the so :on of the modally expanded field equations was found : yield fast and accurate solutions.

DESCRIPTORS (U) *PLASMAS(PHYSICS), *HALL EFFECT, ELECTRON :s, ELECTRICAL CONDUCTIVITY, ALGORITHMS, ELECTROM: :IC FIELDS, ELECTRON DENSITY, ASYMMETRY

IDENTIFIERS (U) Larmor frequency, PE61102F

AD-A170 345 20/2 20/12

COLORADO STATE UNIV FORT COLLINS

(U) Carbon Whisker Study.

DESCRIPTIVE NOTE: Final rept. 1 Mar 84-28 Feb 86,

JUN 86 58P

PERSONAL AUTHORS: Spain,Ian ;

CONTRACT NO. F49620-84-K-0006

PROJECT NO. 2306

TASK NO. C4

MONITOR: AFOSR
TR-86-0660

UNCLASSIFIED REPORT

ABSTRACT: (U) Preliminary work was carried out on the preparation of filaments prepared by ion bombardment of carbon surfaces. The effects of ion energy, ion dose (time), substrate temperature, type of substrate carbon, and the presence of Fe catalyst were investigated. Models for growth were developed at both CSU and IBM.

DESCRIPTORS: (U) *CARBON, *WHISKERS(CRYSTALS), PREPARATION, FILAMENTS, ION BOMBARDMENT, SURFACES, ENERGY, DOSAGE, SUBSTRATES, TEMPERATURE, IRON, CATALYSTS, GRAPHITE, ION BEAMS, SPUTTERING, ATOMS, ADSORPTION

IDENTIFIERS: (U) PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO EVN34M

AD-A170 [illegible] 9/3

UNIVE[illegible]Y OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECT[illegible]L ENGINEERING

(U) Re[illegible]ility Modeling and Analysis of Communication Ne[illegible]s with Dependent Failures.

JAN 8[illegible] 4P

PERSONAL [illegible]THORS: Lam,Y. F. ;Li,Victor O ;

CONTRACT [illegible]O F49620-85-C-0071, AFOSR-84 0269

PROJECT [illegible] 2304

TASK NO A5

MONITOR AFOSR TR-86-0351

UNCLASSIFIED REPORT

SUPPLEM[illegible]RY NOTE: Pub. in IEEE Transactions on Comm[illegible]ations, vCOM-34 n1 p82 84 Jan 86

ABSTRAC[illegible] (U) This paper presents a new model to study the re[illegible]bility of communication networks in which link fa!lu[illegible]are statistically dependent. The approach tries to id[illegible]f; and model explicitly the events that cause comm[illegible]ation link f;ilures. No conditional probabilities are n[illegible], and so two major difficulties inherent to thes[illegible]ely an exponential number of conditional probab[illegible]ities to deal with and a consistency requirement to sa[illegible]y, are avoided. For reliability computations, some e[illegible]sting algorithms for finding network reliability can be [illegible]d with minor modifications and no significant increa[illegible]n computational complexity.

DESCRIP[illegible] (U) *NETWORK ANALYSIS(MANAGEMENT), *RELI[illegible]ITY(ELECTRONICS), STATISTICAL ANALYSIS, COMMU[illegible]IONS NETWORKS, ALGORITHMS, REPRINTS

IDENTIFI[illegible] (U) Communications links, WUAFOSR2304A5, PE6110[illegible]

AD-A170 [illegible]

AD-A170 330 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Estimating Random Integrals from Noisy Observations: Sampling Designs and Their Performance.

DESCRIPTIVE NOTE: Technical rept. Sep 84-Aug 85,

DEC 85 58P

PERSONAL AUTHORS: Bucklew,James A. ;Cambanis,Stamatis ;

REPORT NO. TR-86

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0353

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Wisconsin Univ., Madison. Dept. of Electrical and Computer Engineering. Supersedes AD-A152 926.

ABSTRACT: (U) The problem of estimating a weighted average of a random process from noisy observations at a finite number of sampling points is considered. The performance of sampling designs with optimal or suboptimal, but easily computable, estimator coefficients is studied. Several examples and special cases are studied included additive independent noise, nonlinear distortion with noise, and quantization noise (Author)

DESCRIPTORS: (U) *STATISTICAL SAMPLES, *ESTIMATES, INTEGRALS, COEFFICIENTS, DISTORTION, QUANTIZATION

IDENTIFIERS: (U) Noisy observation, WUAFOSR2304A5, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 3 5 12/1

NORTH C LINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCES.

(U) Hyp ipticity of the Stochastic Partial Differential Ope. rs.

DESCRIPTI. NOTE: Technical rept. Sep 85-Aug 86.

NOV 85 27P

PERSONAL A. HORS: Ustunel,A. S. ;

REPORT NO IR-128

CONTRACT F49620-85-C-0144

PROJECT N 2304

TASK NO. A5

MONITOR: AFOSR
IR-86-0346

UNCLASSIFIED REPORT

ABSTRACT: (U) In different branches of science one often encoun s the so-called stochastic partial differential equati e.g., in quantum physics, trans, ort theory, polyme ysics, chemistry, signal detection, etc. These equati are then studied in the context of the partic situation from which they originate. This work aims t e a start for a systematic treatment of these equati In fact, it begins with the ideal hypothesis: almost of the operators are elliptic and the equati are driven on one hand with a drift term absolu continuous with respect to the one dimensional Lebesgue measure and on the other hand, the diffusion term is en by a stochastic integral with respect to a finite sional Wiener process. This is typically the case e tered in the filtering of diffusion processes (cf. 2, 10), except here the drift and diffusion operat s are not respectively of the second and first or er, y may depend on the whole history, and their coeffic ts are not necessarily semimartingales.

DESCRIPT (U) *OPERATORS(MATHEMATICS), *PARTIAL DIFFER AL EQUATIONS, STOCHASTIC PROCESSES, INEQUAL IES, DIFFUSION, CALCULUS

AD-A170 3 6

AD-A170 326 CONTINUED

IDENTIFIERS: (U) Hypoellipticity, Semimartingales, WUAFOSR2304A8, PE61102F

AD-A170 328

OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 317 4/2

ILLINOIS STATE WATER SURVEY DIV URBANA

(U) A Th- -etical Framework for Examining Geographical Vari -lity in the Microphysical Mechanisms of Preci-itation Development.

DESCRIPTIV(NOTE: Final rept. 15 Jan 82-14 Jan 85.

JUN 86 101P

PERSONAL A-THORS: Johnson,David B. ;

CONTRACT NO AFOSR-82-00:8

PROJECT NO 2310

TASK NO. A2

MONITOR: AFOSR
TR 86-0484

UNCLASSIFIED REPORT

ABSTRACT: (U) The overall goal of this study was to identify and evaluate the environmental or microphysical parameters that control the efficiency of the various mechanisms of precipitation development. Such evaluations can then be used as the basis for studying, or even predicting, the effect of geographical or climatological differences between regions on the microphysical mechanisms of precipitation development. This study included work on warm rain initiation and development, ice multiplication, snowflake aggregation, and the growth of graupel by collection of supercooled water droplets. During the first year of the study, work concentrated on the warm cloud studies and began on the investigation of snowflake aggregation. With the extension of the study into a third year, additional investigations were made on snowflake aggregation and preliminary investigations were begun to extend these studies into mixed phase (riming) precipitation. The studies of riming and graupel development were quite successful and indicated that the studies of warm rain initiation and development could be extended to include mixed-phase precipitation development. In general, the study identified a number of key parameters that control the microphysical development of precipitation. The two primary parameters that need to be measured on a climatological basis are cloud base temperature and cloud droplet concentration. Other key parameters include the degree of entrainment and stability of the environment.

DESCRIPTORS: (U) *PRECIPITATION, *ATMOSPHERIC PHYSICS, *GEOGRAPHIC AREAS, *CLIMATOLOGY, RAIN, ICE FORMATION, SNOW, WATER, DROPS, SUPERCOOLING, CLOUDS, TEMPERATURE, CONCENTRATION(COMPOSITION), AGGLOMERATES

IDENTIFIERS: (U) Snow flakes, PE61102F, WUAFOSR2310A2

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 318 22/2

WEA C[illegible]RIDGE MA

(U) Wave Propagation and Dynamics of Lattice Structures.

DESCRIPTIVE NOTE: Final rept. 1 Apr 83-30 Sep 85,

OCT 85 27P

PERSONAL AUTHORS: Williams,James H. , Jr;

CONTRACT NO. F49620-83-C-0082

PROJECT NO. 2307

TASK NO. 81

MONITOR: AFOSR
TR-86-0469

UNCLASSIFIED REPORT

ABSTRACT (U) Many papers and reports have been written on the [illegible]cepts, design and poten*ial uses of lattice struc[illegible]s in outer space. Such structures include large anterv[illegible] solar power systems and habitable stations for suppo[illegible]f space colonies. currently, both deployable and erect[illegible] concepts are being investigated for the fa[illegible]ple[illegible]ation of lattice structures. Also, inves[illegible]tions of size considerations indicate that small anten[illegible] ranging from tens of meters in span to solar power [illegible]llectors ranging up to several thousand meters have t[illegible] proposed. Such structural sizes along with strin[illegible]t operational requirements will require consi[illegible]ole information of dynamics, control, materials, nonde[illegible]uctive evaluation (NDE), environmental effects and w[illegible] propagation relating to their design and analy[illegible]. Much has been written on the theoretical aspec[illegible]of the control of such structures. Also, a large numbe[illegible]f vibration analyses have been undertaken. Howev[illegible], despite a distinct recognition of the importance of wa[illegible]propagation in many of the control, vibration and NDE i[illegible]stigations, virtually nothing can be found on wave p[illegible]agation in large space structures (LSS). The goals [illegible] this program were to initiate and to pursue the devel[illegible]t of several aspects of wave propagation analy[illegible]s in LSS. (Author)

DESCRIPTORS. (U) *SELF SUPPORTING STRUCTURES, VIBRATION,

AD-A170 318

AD-A170 318 CONTINUED

WAVE PROPAGATION, DYNAMIC RANGE, REFLECTIVITY, JOINTS, DISPERSION RELATIONS

IDENTIFIERS: (U) LSS(Large Space Structures), NDE(Nondestructive Evaluation), Shear waves, Flexural waves, Longitudinal waves, Lattice structures, Periodic structures, PE81102F, WUAFOSR2307B1

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 311 8/3 8/1

ROCKEFELLER UNIV NEW YORK

(U) Intracellular Injection of Synapsin I or Calcium/Calmodulin-Dependent Protein Kinase II Alters Neurotransmitter Release at the Squid Giant Synapse

DESCRIPTIVE NOTE: Rept. 1 Mar 85-28 Feb 86,

MAY 86 8P

PERSONAL AUTHORS: Llinas,R. ;McGuinness,T L. ;Leonard,C. S. ;Sugimori,M. ;Greengard,P. ;

CONTRACT NO. AFOSR-84-0088

PROJECT NO. 2312

TASK NO. A2

MONITOR. AFOSR TR-86-0418

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the National Academy of Science, U.S.A., v82 p3035-3039 May 85.

ABSTRACT (U) Synapsin I and calcium/calmodulin-dependent protein kinase II were pressure-injected into the presynaptic terminal digit of the squid giant synapse to test directly the possible regulation of neurotransmitter release by these substances. Neurotransmitter release was determined by measuring the amplitude, rate of rise, and latency of the postsynaptic potential generated in response to presynaptic depolarizing steps under voltage clamp conditions. Injection of dephosphosynapsin I decreased the amplitude and rate of rise of the postsynaptic potential, whereas injection of either phosphosynapsin I or heat-treated dephosphosynapsin I was without effect. Conversely, injection of calcium/calmodulin-dependent protein kinase II, which phosphorylates synapsin I on site II, increased the rate of rise and amplitude and decreased the latency of the postsynaptic potential. The effects of these proteins were observed without any detectable change in the initial phase of the presynaptic calcium current. A synapsin I like protein and calcium/calmodulin-dependent protein kinase II were demonstrated by biochemical and

AD-A170 311 CONTINUED

immunochemical techniques to be present in squid nervous tissue. The data support the hypothesis that synapsin I regulates the availability of synaptic vesicles for release.

DESCRIPTORS: (U) *NEUROCHEMICAL TRANSMISSION, *SYNAPSE, *PHOSPHORUS TRANSFERASES, PROTEINS, INJECTION, CONTROL, RELEASE, CALCIUM, PHOSPHORYLATION, DISSOCIATION, ELECTROPHYSIOLOGY, CEPHALOPODA, REPRINTS

IDENTIFIERS: (U) *Kinases, Calmodulin Squids, PE61102F, WUAFOSR2312A2

AD-A170 311

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 [illegible] 8/2

NORTH [illegible]LINA UNIV AT CHAPEL HILL CURRICULUM IN OPERAT[illegible] RESEARCH AND SYSTEMS ANALYSIS

(U) Que[illegible]ng Analysis of Fault-Tolerant Computer Systems

DESCRIPT[illegible] E NOTE: Technical rept.,

DEC 85 25P

PERSONAL [illegible]THORS: Nicola,V. F. ;Kulkarni,V. G. ;Trivedi,K. S. ;

REPORT [illegible]: UNC/ORSA/TR-85-10

CONTRACT [illegible]: DAAG29-84-[illegible]-0048, AFOSR-84-0132

PROJECT [illegible]: 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0388

UNCLASSIFIED REPORT

SUPPLEME[illegible]ARY NOTE: Sponsored in part by Grant NSF-MCS83-0200

ABSTRACT: (U) This paper analyzes a fault-tolerant comput[illegible] system. The failure/repair behavior of the system [illegible]s modeled by an irreducible continuous-time Markov [illegible]ain. Jobs arrive in a Poisson fashion to the syste[illegible] and are serviced according to an FCFS discipline. A fail[illegible] may cause the loss of the work already done on the j[illegible] service, if any; in this case the interrupted job is [illegible]eated as soon as the system is ready to deliver servic[illegible] In addition to the delays due to failures and repair[illegible] jobs suffer delays due to queueing. The authors prese[illegible] a queueing analysis of fault-tolerant systems and st[illegible] the steady-state behavior of the number of jobs in the [illegible]stem. As a numerical example, they consider a system [illegible]th two processors subject to failures and repairs. (Author)

DESCRIPT[illegible]S: (U) *FAULT TOLERANT COMPUTING, *SYSTEMS ANALYS[illegible], QUEUEING THEORY, FAILURE(ELECTRONICS), REPAIR, STEADY [illegible]TATE, DELAY, JOBS

AD-A170 303

AD-A170 303 CONTINUED

IDENTIFIERS: (U) Markov chains, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 282 12/1

PITTSBU... UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Asyr...ic Distributions of Functions of the Eig...es of the Sample Covariance Matrix and Can...al Correlation Matrix in Multivariate Time Seri...

DESCRIPTI... NOTE: Technical rept.,

MAR 86 35P

PERSONAL A...RS: Taniguchi,M. ;Krishnaiah,P. R. ;

REPORT NO TR-86-08

CONTRACT N... F49620-85-C-0008, N00014-85-K-0282

PROJECT NO 2304

TASK NO. ...5

MONITOR: A...OSR
TR 86-0357

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper discusses the asymptotic distrib...ons of eigenvalues of sample covariance matrice...f multivariate time series since the eigenva...s play a fundamental role in multivariate proble...Section 2 gives the limiting distribution of eigenva...s of sample covariance matrices for non-Gaussia...linear vector processes. Further Section 3, derives...a asymptotic expansions of certain functions of eigenva...s of covariance matrix for multivariate Gaussia...stationary processes, and discuss their applica...s for time series principal component analysis. In Sect...4 the author gives the asymptotic expansions of cert...functions of canonical correlation matrix for multiva...te Gaussian stationary processes, and discusses some as...totic properties of a test statistic for canonica...correlations.

DESCRIPT... (U) *EIGENVALUES, *ASYMPTOTIC SERIES, *DISTRI...ION FUNCTIONS, TIME SERIES ANALYSIS, MULTIV...E ANALYSIS, SIGNAL PROCESSING, APPLIED MATHEM...S, COVARIANCE, MATRICES(MATHEMATICS), STATIO...

AD-A170 28...

AD-A170 282 CONTINUED

IDENTIFIERS: (U) WUAFOSR2304A5, PF61102F

AD-A170 282

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 275 12/1 9/3

NORTH CA[illegible]NA UNIV AT CHAPEL HILL CURRICULUM IN OPERATIO[illegible]SEARCH AND SYSTEMS ANALYSIS

(U) Markov Algorithms for Computing the Reliability of Staged [illegible]tworks.

DESCRIPTIVE NOTE: Technical rept.,

APR 88 28P

PERSONAL AUTHORS: Cheng,R. C. ;

REPORT NO. UNC/ORSA/TR-88/8

CONTRACT NO AFOSR-84-0140

PROJECT NO. 2307

TASK NO. A5

MONITOR: AFOSR
TR-88-0436

UNCLASSIFIED REPORT

ABSTRACT: (U) Certain commonly occurring types of network, whether directed or undirected, exhibit a staged structure. Two algorithms, based on node partitioning, are presented which take advantage of such structure and which use a Markov transition-probability form of recursion. The algorithm for directed networks is related to the Markov chain formulation of Bailey and Kulkarni, but for undirected networks a more detailed form of state definition is used related to one suggested by Rosenthal. The computational advantages of the algorithms are discussed and some numerical results presented. (Author)

DESCRIPTORS: (U) *ALGORITHMS, *NETWORK ANALYSIS, MANAGEMENT), NODES, RELIABILITY, COMPUTATIONS, RECURSIVE FUNCTIONS

IDENTIFIERS: (U) Node partition, Markov chains, WUAFOSR2[illegible]7A5, PE61102F

AD-A170 275

AD-A170 274 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) The Multivariate Hazard Construction.

DESCRIPTIVE NOTE: Technical rept.,

FEB 88 44P

PERSONAL AUTHORS: Shaked,Moshe ;Shanthikumar,J. G. ;

CONTRACT NO. AFOSR-84-0205

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0350

UNCLASSIFIED REPORT

ABSTRACT: (U) A new representation, called the total hazard construction, of dependent random variables by means of independent exponential random variables is introduced. Conditions which imply association of nonnegative random variables are found using this construction. Furthermore, new conditions which imply stochastic ordering between two nonnegative random vectors are obtained. These strengthen previous results of the authors. Further applications in reliability theory and in simulation are indicated. (Author)

DESCRIPTORS: (U) *RANDOM VARIABLES, MULTIVARIATE ANALYSIS, TRANSFORMATIONS(MATHEMATICS), DISTRIBUTION, EXPONENTIAL FUNCTIONS, STOCHASTIC PROCESSES, RELIABILITY, SIMULATION

IDENTIFIERS: (U) Hazard construction, WUAFOSR2304A5, PE61102F

AD-A170 274

AD-A170 265 12/1

AR[illegible]NA UNIV TUCSON DEPT OF MATHEMATICS

(U) The Total Hazard Construction, Antithetic Variates and Simulation of Stochastic Systems.

DESC[illegible]PTIVE NOTE: Technical rept.,

AUG 85 24P

PERS[illegible]AL AUTHORS: Shaked,Moshe ;Shanthikumar,J. G. ;

CONT[illegible]CT NO. AFOSR-84-0208

PROJ[illegible]T NO. 2304

TASK NO. A5

MONIT[illegible]R. AFOSR
TR-86-0401

UNCLASSIFIED REPORT

SUPPL[illegible]NTARY NOTE: Prepared in cooperation with Ca[illegible]rnia Univ., Berkeley. School of Business Ad[illegible]istration.

ABST[illegible]T (U) This paper combines recent developments in the[illegible]a of generation of dependent random variables with the [illegible]antages of the use of common and antithetic random nu[illegible]s. This combination yields new efficient methods for [illegible]timating complicated stochastic quantities by sim[illegible]ation. Some theoretical and practical aspects of use of [illegible]ithetic and common random numbers for variance re[illegible]tion while using the total hazard construction are gi[illegible] A proof of their optimality in estimating the ex[illegible]ted value of the response sum or the response dif[illegible]ence of functions of vector arguments with de[illegible]t components is presented. Some numerical ex[illegible]s illu[illegible]rate the theory. (Author)

DESCR[illegible]RS: (U) *RANDOM NUMBER GENERATORS, *RANDOM VA[illegible]ES, SIMULATION, STOCHASTIC PROCESSES, MONOTONE FU[illegible]S, MULTIVARIATE ANALYSIS, ESTIMATES

IDENT[illegible]RS: (U) Variance reduction, PE61102F, WUA[illegible]2304A5

AD-A170 265

AD-A170 264 17/2.1 9/4

MASSACHUSETTS UNIV AMHERST DEPT OF MATHEMATICS AND STATISTICS

(U) Some Remarks on the Asymptotic Behaviour of the Lengths of a Collision Resolution Interval. Revision.

DESCRIPTIVE NOTE: Technical rept.,

DEC 85 12P

PERSONAL AUTHORS: Rosenkrantz,Walter A. ;

CONTRACT NO. AFOSR-82-0187

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0347

UNCLASSIFIED REPORT

ABSTRACT: (U) An operator method is presented for obtaining upper and lower bounds for the expected length of a collision resolution interval for various protocols. The method is elementary in that it circumvents the intricate and ingenious complex variable methods of Fayolle, Flajolet and Hofri. The method can be applied to computing bounds for the delay. A conjecture of Massey's and some its implications, as well as some open questions of more than routine interest, are also discussed.

DESCRIPTORS: (U) *COMMUNICATION AND RADIO SYSTEMS, *INFORMATION THEORY, ASYMPTOTIC SERIES, ALGORITHMS, COMPLEX VARIABLES, CHANNELS, BOUNDARIES, OPERATORS(MATHEMATICS)

IDENTIFIERS: (U) Channel access algorithms, Collision resolution algorithm, PE61102F, WUAFOSR2304A5

AD-A170 264

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 ..8 12/1

NORTH ...LINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCE...

(U) A C...tral Limit Theorem for Markov Paths and Some Pr...ties of Gaussian Random Fields.

DESCRIPT...E NOTE: Technical rept. Sep 85-Aug 86.

FEB 8... 62P

PERSONAL ...THORS: Adler,Robert J. ;Epstein,R. ;

REPORT N...: TR-134

CONTRACT ...): F49620-85-C-0114

PROJECT N... 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0380

UNCLASSIFIED REPORT

ABSTRACT: (U) Our primary aim is to 'build' versions of generali...ed Gaussian processes from simple, elementary compon...s in such a way that as many as possible of the esoter... properties of these elusive objects become intuiti... For generalised Gaussian processes, or fields, indexe... smooth functions or measures on R sub d, our buildi... blocks will be simple Markov processes whose state ... is R sub d. Roughly speaking, by summing functio... of the local times of the Markov processes we shall, ...a a central limit theorem type of result, obtain the Ga...an field. This central limit result, together with r...d results indicating how additive functionals of the ...kov processes generate additive functionals of the fi... yield considerable insight into properties of genera... Gaussian processes such as Markovianess, self-similar... 'locality' of functionals, etc. Although the paper i... comprised primarily of new results, and despite the fac... that the subject matter is somewhat esoteric, our aim... are primarily didactic and expository - we want to try t... initiate the uninitiated into some of the mysteri... of generalised processes via an easily understo...d model. (Author)

AD-A170 25...

AD-A170 258

AD-A170 258 CONTINUED

DESCRIPTORS: (U) *MARKOV PROCESSES, RANDOM VARIABLES, FUNCTIONS(MATHEMATICS), PATHS, ELEMENTARY PARTICLES, INTEGRALS, QUANTUM THEORY

IDENTIFIERS: (U) *Central limit theorem, Gaussian processes

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 244 4/2

PHYSICAL DYNAMICS INC BELLEVUE WA

(U) Nonlinear Internal Gravity Wave Propagation, Saturation, and Absorption in the Atmosphere.

DESCRIPTIVE NOTE: Final rept.10 Feb 83-2 Sep 88,

APR 88 23P

PERSONAL AUTHORS: Dunkerton,Timothy J. ;

REPORT NO PD-NW-88 343R

CONTRACT NO. F49620-83-C-0081, F49620-85-C-0032

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR
TR-88-0490

UNCLASSIFIED REPORT

ABSTRACT (U) Numerical and theoretical studies of internal gravity waves have been performed to understand the role of convective instabilities in nonlinear, large amplitude gravity waves; the effects of saturation and self acceleration on transient gravity wave, mean flow interaction; the role of local convective instabilities in producing turbulent modifications of potential temperature and trace constituents in breaking gravity waves; and the propagation and refraction of inertial and non frictional gravity waves through observed middle atmospheric wind fields. Simulations with a two dimensional, nonhydrostatic gravity wave model indicate that convective adjustment in unstable gravity waves results in a mean flow modification closely approximated by WKB saturation theory in cases where the incident wave field is nearly monochromatic. Convection also limits, and practically prevents, the evolution to a reflecting nonlinear critical layer, even when the incident wave field is not monochromatic. Some critical layer dislocation is observed due to self acceleration in transient gravity waves. Localization of turbulence in a convectively unstable gravity wave can greatly reduce the mixing of heat and trace constituents and implies a large turbulent Prandtl number. Significant lateral movement and refraction of gravity wave rays is observed for inertia gravity waves in realistic wintertime flows. A formula is derived for the onset of dynamical instability in inertia-gravity waves, having a lower threshold than the corresponding amplitude required for convective instability.

DESCRIPTORS: (U) *GRAVITY WAVES, *CONVECTION(ATMOSPHERIC), PRANDTL NUMBER, INTERNAL WAVES, MOMENTUM TRANSFER, TWO DIMENSIONAL, RAY TRACING, WINTER

IDENTIFIERS: (U) WKB approximation, Eliassen Palm Theorem, PE61102F, WUAFOSR2310A1

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 243 11/2 7/4 20/11

PENNSYLVANI* *TE UNIV UNIVERSITY PARK DEPT OF MATERIALS S* E AND ENGINEERING

(U) Surface C istry and Structural Effects in the Stress Corrosion . Glass and Ceramic Materials.

DESCRIPTIVE N. Final rept. Jan 82-Jan 88.

MAR 88 ?P

PERSONAL AUTH* Pantano,Carlo G. ;Mecholsky,John J. ;

CONTRACT NO. -*OSR-82-0013

PROJECT NO. 3

TASK NO. A3

MONITOR: AF* ?
TR 0502

UNCLASSIFIED REPORT

ABSTRACT: (U) The fracture behavior of glasses in the system Na20 03.(3-x)Si02 (x=0.0, 0.2, 0.4, 0.6, 0.8 and 1.0) ha n evaluated, and independently, their chemical co on in aqueous solutions was studied. The changes imp upon the Al203/Si02 ratio, were intended to influence s network structure of the glass. The V-K sub I diagr ere obtained using the constant moment double canti beam technique in a wide variety of environments e n-parameter in Region I was found to be independent ol, whereas the presence of velocity plateaus an esholds was shown to be very dependent upon the cc tion of the aqueous environment. This behavior wa tributed to interactions between the fracture su s behind the crack-tip. The dependence of the n-param upon the bulk composition and structure of the glas s correlated with the elastic properties of the glas i.e., the value of the n-parameter did not depend dire y upon the corresponding corrosion resistance o the glass. Finally, the static fatigue limit, at le t in the case of the Na20.3Si02 (x=0.0) glass, could e explained in terms of crack-healing rather than ck-blunting. Although, this study of fracture wi n a systematic compositional series of glasses led t critical assessments of the existing models for environment-dependent crack growth in glass. The results of comparable-although less extensive-studies on fluorozirconate glasses and silica sol/gel materials are also reported.

DESCRIPTORS: (U) *GLASS, *CERAMIC MATERIALS, *STRESS CORROSION, SURFACE CHEMISTRY, MOLECULAR STRUCTURE, SILICA GLASS, SODIUM, OXIDES, ALUMINUM OXIDES, SOLUTIONS(MIXTURES), FRACTURE(MECHANICS), ELASTIC PROPERTIES, STATIC LOADS, FATIQUE(MECHANICS), CRACK PROPAGATION, VELOCITY, PLATEAUS, THRESHOLD EFFECTS, ZIRCONATES

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3

AD-A170 243

AD-A170 243

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 230 9/2

DUKE UNIV DURHAM NC DEPT OF COMPUTER SCIENCE

(U) A Hierarchical Combinatorial-Markov Method of Solving Complex Reliability Models.

DESCRIPTIVE NOTE: Technical rept.,

83 25P

PERSONAL AUTHORS: Sahner,Robin A. ;Trivedi,Kishor S. ;

REPORT NO. CS-1988-14

CONTRACT NO. DAAG29-84-C-0045, AFOSR-84-0132

PROJECT NO. 2304

TASK NO. A5

MONITOR AFOSR
TR-86-0383

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Gould CSD, Urbana, IL.

ABSTRACT: (U) The design process for complex, fault-tolerant systems needs to be supported by cost-effective and accurate techniques for design evaluation in order to facilitate trade-off analysis. Combinatorial models such as fault trees and reliability block diagrams are efficient in both specification and evaluation of system models. But it is difficult if not impossible to allow for various types of dependency (such as repair dependency and near-coincident-fault type dependency), transient and intermittent faults, standby systems with warm states, and so forth. Markov models can capture such interacting system behavior. However, the size of a Markov model for the evaluation of such a system may grow exponentially with the number of components in the system. One approach that has been successful in connection with ultrahigh reliability modeling is called behavioral decomposition. This approach is based on the decomposition of the model along temporal lines, separately analyzing a fast submodel (corresponding to fault/error-handling behavior) and a slow submodel (corresponding to the fault-occurrence behavior). In practical problems, however, the fault-occurrence behavior itself gives rise to a large number of states in the underlying stochastic process. This paper presents an approach for avoiding the large state space problem in the fault-occurrence model while retaining the benefits of behavioral decomposition. (Author)

DESCRIPTORS: (U) *FAULT TOLERANT COMPUTING, *SYSTEMS ENGINEERING, *RELIABILITY(ELECTRONICS), COST EFFECTIVENESS, TRADE OFF ANALYSIS, COMBINATORIAL ANALYSIS, MATHEMATICAL MODELS, MARKOV PROCESSES

IDENTIFIERS: (U) SHARPE(Symbolic Hierarchical Automated Reliability and Performance Evaluator), SHARPE computer program

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 [illegible] 12/1

MASSA[illegible]ETTS UNIV AMHERST DEPT OF MATHEMATICS AND STATI[illegible]S

(U) A[illegible]ximate Counting. A Martingale Approach.

DESCRIP[illegible]E NOTE: Interim rept. 15 May 85-14 May 86.

FEB [illegible] 14P

PERSONAL AUTHORS: Rosenkrantz,Walter A. ;

CONTRACT NO. AFOSR-82-0187

PROJECT NO. 2304

TASK NO A5

MONITOR AFOSR TR-86-0377

UNCLASSIFIED REPORT

ABSTRACT (U) Approximate counting is a probabilistic algori[illegible]a for keeping track to large numbers of events by means [illegible] counters of limited range. In this paper we prese[illegible]an analysis of this algorithm using the eleme[illegible]; theory of martingales. The methods are also appli[illegible]a to the analysis of the counter which occurs in the e[illegible]ential back off protocol. (Author)

DESCRIP[illegible]S (U) *COUNTING METHODS, *ALGORITHMS, PROBA[illegible]TY, RANDOM VARIABLES, ESTIMATES, INEQUALITIES

IDENTIF[illegible] (U) *Approximate counting, Martingales, Markov[illegible]ains, PE61102F, WUAFOSR2304A5

AD-A170 226 20/5

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES

(U) A Precision Laser Spectrometer System.

DESCRIPTIVE NOTE: Final rept. 15 Aug 83-31 Aug 84,

APR 86 13P

PERSONAL AUTHORS: Gundersen,Martin ;Reisler,Hanna ;Wittig, Curt ;

CONTRACT NO. AFOSR-83-0306

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR TR-86-0356

UNCLASSIFIED REPORT

ABSTRACT: (U) An excimer laser based dye laser system has been purchased and integrated into experiments which involve DOD funding. The laser system is currently used in several important experiments: photodissociation of aliphatic nitro and nitroso alkanes, and halogen cyanides; bimolecular reactions of C2H, and cluster reactions of H with CO2; laser induced influorescence studies in pulsed power switches such as thyratrons. The laser system has already become an integral part of these studies, and will be used in other funded research in the future.

DESCRIPTORS: (U) *EXCIMERS, *DYE LASERS, REACTION KINETICS, PHOTODISSOCIATION, LASER INDUCED FLUORESCENCE, THYRATRONS, ALIPHATIC HYDROCARBONS, NITRO RADICALS, NITROSO COMPOUNDS, ALKANES, HALOGENS, CYANIDES, ELECTRONIC SWITCHES, PHOTOLYSIS, CHEMILUMINESCENCE

IDENTIFIERS: (U) Aliphatic nitro, Nitroso alkanes, Halogen cyanides, WUAFOSR2301A7, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 . . 4 14/5 20/6

PENNS . . IA STATE UNIV UNIVERSITY PARK DEPT OF ELECT. . L ENGINEERING

(U) W. . . Light Optical Information Processing and Ho. . . aphy.

DESCRIP. . t NOTE: Annual rept. 15 Mar 84-14 May 85.

. UL . . 57P

PERSONA. . THORS: Yu,Francis T. ;

CONTRACT . . AFOSR-83-0140

PROJECT . . 2305

TASK NO 81

MONITOR AFOSR TR-86-0483

UNCLASSIFIED REPORT

ABSTRAC. (U) Explored is the possibility of using natur. . solar light for Holographic image processing. The advan. . of this technique is the processing system does not r. . e to carry its own light source. It is very suita. . for spaceborne and satellite application. Devel. . is a technique of measuring the noise perfo. . e of a white light processor. A programmable Magne. . ptic spatial light modulator is applied to white light . . al processing. The MOSLM responds to polarized light . . ich offers the advantage of color coding signal proce. . . The most important aspect of this device must be t. . grammability, for which a real time progr. . le optical processor can be realized in prac. . A technique is developed for generating a Four. . ransform hologram with a white light source. This . . ique is very suitable for reconstructing color holo. . images with white-light processing. So is a tech. . of generating a spatial frequency color coded spec. . ctrogram with a white light optical system. This . . m not only offers a low cost alternative but also . . inated the complicated programming procedure with . . tal counterpart. A spatial encoding technique is devel. . for color image retrieval so that the annoying moire . . inges can be eliminated.

AD-A170 224 CONTINUED

DESCRIPTORS: (U) *HOLOGRAPHY, *IMAGE PROCESSING, *WHITE LIGHT, OPTICAL PROCESSING, FOURIER TRANSFORMATION, SUNLIGHT, MAGNETOOPTICS, COLORS, NOISE REDUCTION, SPEECH ANALYSIS, REAL TIME, SIGNAL PROCESSING, LIGHT MODULATORS, SPATIAL FILTERING

IDENTIFIERS: (U) Speech spectrograms, WUAFOSR230581, PE61102F

AD-A170 2.1 12/1

ARIZONA ..V TUCSON DEPT OF MATHEMATICS

(U) On t: First Failure Time of Dependent Multicomponent Reli: lity Systems.

DESCRIPTIV. NOTE: Technical rept.,

DEC 85 30P

PERSONAL A .RS: Shaked,Moshe ;Shanthikumar,J. G. ;

CONTRACT N. AFOSR-84-0205

PROJECT NO 2304

TASK NO. .5

MONITOR: .FOSR
.R 88-0355

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper are considered multicom.nt reliability systems where component failure .repair completion rates depend on the state, ages and .rent repair durations of the other components. This is a .eralization of a model of Ross (1984). Sufficie. conditions on the sets of rates which imply stochast. rdering between first failure times of two such sys. are found. Sufficient conditions on the rates wh. imply that the first failure time of such a system is .r better than used (NBU) are given. Some results o. arlow and Proschan (1978), Chiang and Niu (1980) a. oss (1978) are obtained as special cases. A counterex.le to an apparently stronger result of Miller (1979) is .so given. Further results and a discussion are incl. (Author)

DESCRIPTORS (U) *MATHEMATICAL ANALYSIS, FAILURE, RELIABILI. REPAIR, STOCHASTIC PROCESSES, MULTIVARIATE ANALYSIS, .NDOM VARIABLES

IDENTIFIERS (U) DMRS(Dependent Multicomponent Reliabilit. Systems), WUAFOSR2304A5, PE61102F

AD-A170 223

AD-A170 218 11/8 20/12

SOUTHWEST RESEARCH INST SAN ANTONIO TX

(U) Study of the Influence of Metallurgical Factors on Fatigue and Fracture of Aerospace Structural Materials.

DESCRIPTIVE NOTE: Final rept. 1 Jan 83-31 Dec 85,

FEB 86 34P

PERSONAL AUTHORS: Lankford,James ;Leverant,Gerald R. ; Davidson,David L. ;Chan,Kwai S. ;

CONTRACT NO. F49620-83-C-0054

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR
TR-86-0493

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the results of a two-phase study involving (1) experimental characterization and analytical modeling of fatigue crack tip micromechanics in aerospace structural (Al and Ti) alloys, and (2) identification and modeling of key factors controlling subcritical crack growth and unstable fracture in single crystal nickel-base superalloys. Fatigue crack growth at near-threshold rates has been modeled using micro-structurally-controlled micromechanical crack tip parameters. The model is based on the concept of crack opening by means of local slip lines whose length and dislocation density are controlled by the alloy microstructure. Crack tip opening displacement, crack tip strain, and the increment of crack advance are micromechanical parameters which depend on the number, spacing, and orientation of the slip lines. Fatigue crack growth mechanisms in Ni-base superalloy single crystals were examined as a function of crystallographic orientation, stress state and slip character. Using compact-tension and tubular specimens, fatigue crack growth in Mar-M200 single crystals of various crystallographic orientations was determined in both unidirectional and multiaxial cyclic loads, at temperatures where the slip character was either localized (25 C) or homogeneous (980 C).

AD-A170 218

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 21[illegible] CONTINUED

DESCRIPTO (U) *ALUMINUM ALLOYS, *TITANIUM ALLOYS, *METALL[illegible], *COMPOSITE STRUCTURES, NICKEL ALLOYS, SUPERAL[illegible], AIRFRAMES, AEROSPACE SYSTEMS, CRACK PROPAG[illegible], FRACTURE(MECHANICS), CRYSTALLOGRAPHY, GROWTH[illegible]AL), MICROSTRUCTURE, FATIGUE(MECHANICS), CRACKI[illegible]CTURING), COMPOSITE MATERIALS, STRUCTURAL PROPERT[illegible]

IDENTIFIE (U) Aerospace structures, Crack tip, LPN-SWRI-74[illegible], WUAFOSR2306A1, PE61102F

AD-A170 217 12/1

&BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

(U) Interaction of Diffusion and Boundary Conditions.

JUL 86 37P

PERSONAL AUTHORS: Hale,Jack K. ;Rocha,Carlos ;

REPORT NO. LCDS-85-24

CONTRACT NO. DAAG29-83-K-0029, AFOSR-84-0376

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-86-0372

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by Grant NSF-DMS85-07056.

ABSTRACT: (U) For systems of reaction diffusions, the existence and behavior of the solutions on the compact attractor are discussed for large diffusion coefficients and boundary conditions which can vary from Neumann to Dirichlet conditions.

DESCRIPTORS: (U) *PARTIAL DIFFERENTIAL EQUATIONS, *DIFFUSION, *SOLUTIONS(GENERAL), EIGENVECTORS, LYAPUNOV FUNCTIONS

IDENTIFIERS: (U) Dirichlet problem, Neumann problem, Bifurcation theory, WUAFOSR2304A1, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 211 20/12 9/F

CITY COLL NEW YORK ULTRAFAST SPECTROSCOPY AND LASER LAB

(U) Semiconductors Investigated by Time Resolved Spectroscopy Using Femtosecond and Picosecond Laser Technology.

DESCRIPTIVE NOTE: Final rept. 1 Dec 84-30 Nov 85.

MAR 86 19P

PERSONAL AUTHORS: Alfano,Robert R. ;

REPORT NO. 447215

CONTRACT NO. AFOSR-85-0013

PROJECT NO. 2305

TASK NO C1

MONITOR. AFOSR
TR-86-0500

UNCLASSIFIED REPORT

ABSTRACT: (U) Four major accomplishments have been achieved to help further the development of faster photonic and electronic devices. 1. We have shown theoretically and experimentally how one can determine accurately one of the most important parameters in microstructures: the bandgap discontinuity in valence and conduction bands at the heterojunction from the photoluminescence measurements for ultrathin wells in the range of 15 to 80 A for GaAs/AlGaAs and GaInAs/AlInAs structures. 2. A model was developed using the electron degeneracy to describe the much slower carrier - optical phonon loss relaxation rate measurements in 2D as compared to 3D. 3. The valence and conduction band deformation potentials were separately determined for the first time in semi magnetic semiconductor alloys of Cd(1-x)Mn(x)Se from the shift in photoluminescence spectra versus x. The valence band deformation potential of wurtzite crystals is much larger compared to the one in zinc blende. This technique measures separately the value of valence and conduction band deformation potential instead of the difference between them. 4. The direct picosecond spin dephasing time and degree of spin alignment of photoexcited electrons in semi magnetic

AD-A170 211

AD-A170 211 CONTINUED

semiconductor alloys of Cd(1-x)Mn(x)Se was measured. The fast dephasing times arise from the spin exchange between free carriers and the localized Mn+ ions.

DESCRIPTORS: (U) *SEMICONDUCTOR DEVICES, *HETEROJUNCTIONS, *LASER PUMPING, OPTICAL PROPERTIES, LIGHT PULSES, GALLIUM COMPOUNDS, INDIUM COMPOUNDS, ALUMINUM GALLIUM ARSENIDE, CADMIUM SELENIDES, POLARIZATION, SPIN STATES, MAGNETIC MATERIALS, MOLECULAR STRUCTURE, PHONONS, PHOTOLUMINESCENCE

IDENTIFIERS: (U) Quantum wells, Aluminum indium arsenide, Gallium indium arsenide, Cadmium manganese selenide, Wurtzite, Fem to second time, Picosecond time, WUAFOSR2305C1, PE61102F

AD-A170 211

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 210 11/4 20/11

GEORGIA INST OF TECH ATLANTA SCHOOL OF CIVIL ENGINEERING

(U) Failure Processes in Advanced Composite Structures.

DESCRIPTIVE NOTE: Final rept. 1 Jul 78-15 Nov 80.

JAN 81 268

PERSONAL AUTHORS: Rehfield,L. W. ;Atluri,S. N. ;

CONTRACT NO F49620-78-C-0085

PROJECT NO 2307

TASK NO. B1

MONITOR: AFOSR
TR-82-0114

UNCLASSIFIED REPORT

ABSTRACT (U) A new assumed stress hybrid finite element method based on a complementary energy principle, has been developed for stress as well as fracture analyses of angle ply laminates. The loading cases can include inplane as well as general bending loads. In this method, the full three-dimensional stress-state (including the transverse shear and normal stresses) in each lamina is accounted for; the mixed-mode stress and strain singularities near the crack front, the intensities of which vary within each ply in the thickness direction of the laminate, are embedded in special elements near the crack-front.

DESCRIPTORS: (U) *STRESS ANALYSIS, *COMPOSITE STRUCTURES, *LAMINATES, FRACTURE(MECHANICS), CRACKS, ANGLES, FINITE ELEMENT ANALYSIS, THREE DIMENSIONAL, SHEAR STRESSES, DIRECT STRESS, BENDING STRESS, ENERGY, STRESS STRAIN RELATIONS, THICKNESS, EPOXY COMPOSITES, TAPES, METALS, HOLES(OPENINGS), STRUCTURAL MEMBERS, HYBRID SIMULATION

IDENTIFIERS: (U) Complementary energy principles, Angle ply laminates, Metallic laminates, WUAFOSR230781, PE61102F

AD-A170 210

AD-A170 208 12/1 14/4

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

(U) On Prediction Intervals for Future Observations from the Inverse Gaussian Distribution.

DESCRIPTIVE NOTE: Interim technical rept.,

JAN 86 12P

PERSONAL AUTHORS: Padgett,W. J. ;Tsoi,S. H. ;

REPORT NO. TR-109, 82F25-1

CONTRACT NO. AFOSR-84-0156

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0412

UNCLASSIFIED REPORT

ABSTRACT: (U) The problem of predicting, on the basis of an observed sample of size n from an inverse Gaussian distribution, a future observation from the same distribution is discussed. Two prediction intervals that have been proposed in the literature, one of which is an approximate prediction interval, are compared using Monte Carlo simulations. The results indicate that in many of the simulated cases the approximate prediction interval is superior with respect to larger estimated coverage probabilities and smaller estimated mean lengths. This is true in particular for n at least 15 and for 95% and 99%.

DESCRIPTORS: (U) *LIFE TESTS, *MATHEMATICAL PREDICTION, RELIABILITY, QUALITY CONTROL, PROBABILITY DENSITY FUNCTIONS, GAUSSIAN QUADRATURE, MONTE CARLO METHOD, STATISTICAL SAMPLES

IDENTIFIERS: (U) Inverse problems, WUAFOSR2304A5, PE61102F

AD-A170 209

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 204 20/7

MISSION RESEARCH CORP ALBUQUERQUE NM

(U) Beam Propagation Experimental Study.

DESCRIPTI. NOTE: Annual rept.,

MAR 82 36OP

PERSONAL A RS: Ekdahl,C. A. ;

REPORT NO. AMRC-R-352

CONTRACT N. F49620-81-C-0018

PROJECT NO. 2301

TASK NO. A7

MONITOR: SR
88-0503

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: (U) A program of extensively diagnosed experiments to investigate the physics of intense relativistic electron beam propagation in low density air is in progress using beam generators. The primary objectives of this research are the rate of erosion of the head of the beam, and to investigate resistive instabilities, such as the hose and hollowing modes, that limit the transport of beam energy over significant distances. The tasks of delineating the pressure range for maximum energy transport and measuring the temporal evolution of the current density profile of the beam produced by the FX-100 have been accomplished. Maximum energy transport (measured calorimetrically) of the FX-100 beam (about 1.5 MeV, 40 kA, 120 ns) occurred at 0.3-0.5 Torr air pressure. This air pressure window for maximum energy transport was defined by loss of the tail of the beam at low pressures and by erosion of the beam head at low pressures. Propagation in the window was characterized by a high degree of current neutralization (about 80% or more), by intense light emission, suggestive of strong avalanche breakdown, and by the onset of a virulent hollowing instability that resulted in as much as 80% of the beam current being carried in a

AD-A170 204

AD-A170 204 CONTINUED

thin annular shell at a radius about twice the Bennett radius characterizing the initially injected current distribution.

DESCRIPTORS: (U) *PARTICLE BEAM WEAPONS, *ELECTRON BEAMS, *BEAM FORMING, PARTICLE ACCELERATORS, EROSION, ELECTRODES, RANGE(DISTANCE), CURRENT DENSITY, ENERGY TRANSFER, LOSSES, VACUUM APPARATUS, WINDOWS, RADIATION ABSORPTION, RELATIVITY THEORY

IDENTIFIERS: (U) Plasma instabilities, Hose instabilities, Hollowing instabilities, Bennet radius, WUAFOSR2301A7, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 202 5/10 6/16 6/19

EEG SYSTE[illegible] LAB SAN FRANCISCO CA

(U) Neuro[illegible]itive Pattern Analysis of Auditory and Visual Infor[illegible]on.

DESCRIPTIVE [illegible]TE: Interim rept. 24 Mar 84-31 Jan 86.

FEB 86 63P

PERSONAL AU[illegible]RS: Gevins,Alan S. ;

CONTRACT NO F49620-84-K-0008

PROJECT NO 2313

TASK NO. A4

MONITOR: [illegible]SR
[illegible]86-0485

UNCLASSIFIED REPORT

ABSTRACT: (U) The EEG Systems Laboratory has been actively [illegible]roving the measurement of neuroelectric substrate[illegible] human higher brain functions. The short-term obje[illegible]e has been to use the EEG to predict decrements[illegible]n performance consequent to attentional lapses or [illegible]atigue. The long-term objective is to develop new techn[illegible]ies for enhancing cognitive abilities. The laborator[illegible]ntinues to test subjects in highly controlle[illegible]radigms. The paradigms test elementary cognitive [illegible] perceptuomotor functions critical for flying hi[illegible]performance aircraft and for performing other tasks wit[illegible] high cognitive loads. Data are being analyzed [illegible]e an interdisciplinary, inter-laboratory study of [illegible]ational fatigue. This unique set of data consists [illegible]7 channels of neurophysiological, physiolog[illegible]l and buhavioral data recorded from 4 Air Force fi[illegible]r test pilots performing several cognitive and perc[illegible]motor tasks specially designed to require a high com[illegible]nt of attention, memory, judgement and motor coordinat[illegible] Recordings were made in 3 sessions dealing with task [illegible]arning, operational fatigue (about 16 hours of contin[illegible]s performance), and automatization of task performan[illegible]

DESCRIPTORS (U) *ELECTROENCEPHALOGRAPHY, *NEUROPHYS[illegible]OLOGY, *FATIGUE(PHYSIOLOGY), *COGNITION, *PERCEPTION, *MOTOR REACTIONS, TEST METHODS, PILOTS, PERFORMANCE(HUMAN), ATTENTION, MEMORY(PSYCHOLOGY), JUDGEMENT(PSYCHOLOGY), LEARNING, HEARING, VISION, PATTERN RECOGNITION

IDENTIFIERS: (U) Evoked potentials, PE61102F, WUAFOSR2313A4

AD-A170 202 AD-A170 202

AD-A170 201 8/7 12/1

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

(U) Nonlinear Wave Propagation Study.

DESCRIPTIVE NOTE: Final rept. 1 May 83-30 Oct 85,

APR 86 82P

PERSONAL AUTHORS: Bulau,J. R. ;Tittmann,B. R. ;

REPORT NO. SC5361-10FR

CONTRACT NO. F49620-83-C-0065

PROJECT NO. 2309

TASK NO. A2

MONITOR: AFOSR
TR-86-0497

UNCLASSIFIED REPORT

ABSTRACT: (U) We have examined some of the methods available for use in the laboratory to measure the inelastic attenuation of seismic waves in rocks. We conclude that the forced swept resonance technique is best suited for measuring the Q of linear anelastic materials and for defining the transition amplitude from linear to inelastic behavior to nonlinear behavior. For evaluating losses in materials at high amplitudes, which exceed the elastic limit, the best technique requires simultaneous measurements of the time functions of stress and strain under conditions that simulate seismic loading as closely as possible.

DESCRIPTORS: (U) *NONLINEAR SYSTEMS, *GRANITE, *ROCK, *NONLINEAR PROPAGATION ANALYSIS, ELASTIC PROPERTIES, NEAR FIELD, ATTENUATION, PRESSURE, LOOPS, HYSTERESIS

IDENTIFIERS: (U) Westerly granite, PE61102F, WUAFOSR 3A2

AD-A170 201

AD-A170 200 6/20

YALE UNIV NEW HAVEN CONN SCHOOL OF MEDICINE

(U) Studies of Organophosphate Effects on Retinal Physiology, Cell Biology and Biochemistry.

DESCRIPTIVE NOTE: Final progress rept. 1 Apr 82-31 Mar 84,

SEP 85 33P

PERSONAL AUTHORS: Reid,Ted W. ;Stein,Peter J. ;

CONTRACT NO. F49620-82-C-0050

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR
TR-86-0496

UNCLASSIFIED REPORT

ABSTRACT: (U) We have approached the problem of DFP effects on the eye in several ways: 1) Dose response curves for DFP inhibition of cellular synthesis of DNA was studied in three different cell types. 2) Electroretinograms (ERG's) were recorded from isolated retinas of Bufo marinus during superfusion with the compound. 3) Intracellular recordings were made from rod photoreceptors in isolated retinas while superfusing with NaF. 4) The effects of fluoride on the protein-protein interactions and the enzymology of the cyclic nucleotide cascade of rod outer segments were studied. 5) DFP binding to rod outer segment and retinal proteins was observed. 6) We have measured the transport of DFP across the cornea. The data obtained show that both DFP and fluoride alter various enzymatic and physiological functions in cultured cells, the isolated retina, and rod outer segment membranes. The data obtained in the project reveal that both DFP and fluoride may alter ocular biochemistry and physiology through other than classical acetylcholinesterase mechanisms. While a number of the studies performed are preliminary, the data are sufficiently interesting to demand further investigation.

DESCRIPTORS: (U) *ORGANIC PHOSPHORUS COMPOUNDS, *PROPYL RADICALS, *FLUORINE, *TOXICITY, *RETINA, VISION, DOSAGE, CELLS(BIOLOGY), BIOSYNTHESIS, DEOXYRIBONUCLEIC ACIDS,

AD-A170 200

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 200 CONTINUED

INHIBITION, ELECTRORETINOGRAPHY, FLUORIDES, IONS, PROTEIN MOLECULE MOLECULE INTERACTIONS, CORNEA, TRANSPORT PROPERTIES, PHOSPHATASES, ESTERASES

IDENTIFIERS (U) DFP(Diisopropylfuorophosphate), Phosphate Diisopropylfluoro, PE61102F, WUAFOSR2312A5

AD-A170 199 11/6 20/11

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) A Study of the Fatigue Behavior of Short Cracks in Nickel-Based Superalloys.

DESCRIPTIVE NOTE: Progress rept. 1 Jan 84-30 Nov 85,

NOV 85 38P

PERSONAL AUTHORS: Pelloux,R. M. ;Romanoski,G. R. ;Feng,J. ;

CONTRACT NO. AFOSR-76-2928, AFOSR-84-0075

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR TR-86-0224

UNCLASSIFIED REPORT

ABSTRACT: (U) Fatigue behavior of short cracks was studied in Inconel X-750, Inconel 718, Waspaloy and PM-Rene 95. Crack growth rates were measured for crack lengths from 50 microns to 2mm. Three regimes of behavior were generally observed: 1) an initiation regime in which crack propagation rates are nearly zero; 2) a short crack regime in which crack propagation rates increase slowly and variably with crack length but with propagation rates higher than would be predicted by LEFM in the near-threshold regime; and 3) a long crack regime in which conventional fracture mechanics is applicable. The threshold criterion and crack propagation rates for short cracks are shown to be strongly dependent on the stress ratio. Negative stress ratios promotes rapid crack initiation. This behavior is confirmed theoretically by a Dugdale model which establishes a criterion for crack extension based on the accumulation of plastic work in the crack tip plastic zone. Fractographic investigations show that short cracks propagate in a transgranular-crystallographic mode following a zig-zag path which is macroscopically perpendicular to the applied stress. An experimental technique was developed to generate small eliptical crack initiation sites using a pulsed Nd-YAG laser. An AC potential drop system for continuous and

AD-A170 200

AD-A170 199

AD-A170 189 CONTINUED

automated measurements of crack length at elevated temperatures has been assembled.

DESCRIPTORS (U) *CRACK PROPAGATION, *SUPERALLOYS, *NICKEL ALLOYS, *FATIGUE(MECHANICS), TURBINE COMPONENTS, CRACKS, GROWTH, RATES, MATHEMATICAL PREDICTION, FRACTURE MECHANICS), HIGH TEMPERATURE, STRESSES, RATIOS, NICKEL ALLOYS, INCONEL, FRACTOGRAPHY, PULSED LASERS

IDENTIFIERS (U) Short cracks, Crack tips, Waspaloy, Rene-95 alloy, Crack propagation rates, Dugdale models, Threshold, Crack initiation, Neodymium YAG lasers, PE61102F, AFOSR2306A1

AD-A170 192 11/3

PITTSBURGH UNIV PA DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) Advanced High Temperature Coating Systems Beyond Current State of the Art Systems.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan 80-31 Dec 84,

APR 86 143P

PERSONAL AUTHORS: Ashary,A. ;Meier,G. H. ;Pettit,F. S. ;

CONTRACT NO. AFOSR-80-0089

PROJECT NO. 2306

TASK NO. A2

MONITOR: AFOSR TR-86-0481

UNCLASSIFIED REPORT

ABSTRACT: (U) Alpha-Al203 and the SiO2 are the two most effective reaction product barriers that can be used to protect alloys from oxidation at temperatures above 1000 C. In the present work the techniques to improve the adherence of Al203 scales on MCrAl coating alloys are studied and the characteristics of SiO2 scales formed on Ni-Si alloys are investigated. The theoretical aspects of oxide-metal adhesion are examined and the factors which affect the adherence of oxide scales in general are clearly defined. A critical review of the previously proposed mechanisms of the improved scale adherence by active element additions is prasented. Experimentally, the effects of small additions of yttrium and hafnium on the isothermal and cyclic oxidation behavior of MCrAl type alloys are studied. The base alloys used in the study of Al203 scale adherence were Ni-20wt%Cr-10wt%Al and Co-20wt%Cr-10wt%Al. Both the isothermal and the cyclic oxidation tests were carried out at 1100 C for varying durations. Emphasis is given to the in situ study of the oxide scale failure process. An acoustic emission (AE) technique was employed for this purpose. The above study indicates that the Al203 scale failure processes are quite different in the doped (i.e. containing oxygen active elements) and updoped alloys. Although both

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 1.. CONTINUED

yttri.. and hafnium can be very effective in improving the a.. ..ce of Al2O3 scales, there are some basic differ.. ..s in their oxidation behavior in alloys. There.. the optimum conditions for their addition also differ.. ..loys in the Ni-Si system (5 to 22.6wt% Si) have been o.. ..ized in the temperature range 900 to 1100 C.

DESCRIPT.. (U) *PROTECTIVE COATINGS, *ALUMINUM OXIDES, *SILI.. ..OXIDE, HIGH TEMPERATURE, OXIDATION RESISTANCE, CHROMI.. ..LOYS, ALUMINUM ALLOYS, NICKEL ALLOYS, SILICON ALLOYS .. ..ESION, ADDITIVES, YTTRIUM, HAFNIUM, COBALT, FAILU.. ..PING

IDENTIFI.. (U) WUAFOSR2306A2

AD-A170 187 12/1

BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

(U) Upper Semicontinuity of Attractors for Approximations of Semigroups and Partial Differential Equations.

DESCRIPTIVE NOTE: *Technical rept.,*

OCT 85 74P

PERSONAL AUTHORS: Hale,Jack K. ;Lin,Xiao-Biao ;Raugel, Genevieve ;

REPORT NO. LCDS-85-29

CONTRACT NO. DAAG29-83-K-0029, AFOSR-84-0376

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-86-0374

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Michigan State Univ., East Lansing. Dept. of Mathematics and Ecole Polytechnique (France). Centre de Mathematiques Appliquees. Sponsored in part by Grant NSF-DMS85-07056.

ABSTRACT: (U) Suppose a given evolutionary equation has a compact attractor and the evolutionary equation is approximated by a finite dimensional system. Conditions are given to ensure the approximate system has a compact attractor which converges to the original one as the approximation is refined. Applications are given to parabolic and hyperbolic partial differential equations.

DESCRIPTORS: (U) *APPROXIMATION(MATHEMATICS), *PARTIAL DIFFERENTIAL EQUATIONS, CONVERGENCE, BANACH SPACE, WAVE EQUATIONS

IDENTIFIERS: (U) *Attractors, *Semigroups(Mathematics), Semicontinuity, PE61102F, WUAFOSR2304A1

AD-A170 187

AD-A170 187

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 185 12/1

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION RESEARCH

(U) Random Field Identification from a Sample. I. The Independent Case.

DESCRIPTIVE NOTE: Technical rept.,

NOV 85 25P

PERSONAL AUTHORS: Rosenblatt-Roth,Millu ;

REPORT NO. CAR-TR-166, CS-TR-1563

CONTRACT NO. F49620-85-K-0009

PROJECT NO 2304

TASK NO. A7

MONITOR: AFOSR
TR-88-0388

UNCLASSIFIED REPORT

ABSTRACT: (U) Given a random field belonging to some specific class, and given a data sample generated by the random field, the author considers the problem of finding a field in the given class that approximates the field that generated the sample. This paper derives a solution to this problem for the simple case of a field consisting of independent random variables. Subsequent papers will treat other types of fields, e.g., having Markov dependence. Numerical examples are given, showing that good approximations can be obtained based on relatively small sample sizes. In particular, this approach can be used to model random field models that generate given samples of image texture, and so can be applied to texture classification or segmentation. (Author)

DESCRIPTORS: (U) *STATISTICAL SAMPLES, APPROXIMATION(MATHEMATICS), THEOREMS, INVERSION, RANDOM VARIABLES, SEQUENCES(MATHEMATICS), PROBLEM SOLVING, MARKOV PROCESSES, STATIONARY

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A7

AD-A170 184 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Normalizing Transformations of Some Statistics of Gaussian ARMA Processes.

DESCRIPTIVE NOTE: Technical rept.,

FEB 86 24P

PERSONAL AUTHORS: Taniguchi,M. ;Krishnaiah,P. R. ;Chao,R. ;

REPORT NO. TR-86-05

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0395

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper, the authors investigate Edgeworth type expansions of certain transformations of some statistics of Gaussian ARMA processes. They also investigated transformations which will make the second order part of the Edgeworth expansions vanish. Some numerical studies are made and they show that the above transformations give better approximations than the usual approximation. (Author)

DESCRIPTORS: (U) *TRANSFORMATIONS(MATHEMATICS), *NORMALIZING(STATISTICS), NUMERICAL ANALYSIS, APPROXIMATION(MATHEMATICS), EXPANSION, TIME SERIES ANALYSIS, MAXIMUM LIKELIHOOD ESTIMATION, MULTIVARIATE ANALYSIS

IDENTIFIERS: (U) Edgeworth expansion, ARMA(Autoregressive Moving Average)

AD-A170 183 12/1 6/3

NORTH CA[illegible]NA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Data Transformations in Regression Analysis with Applications to Stock - Recruitment Relationships.

DESCRIPTIVE NOTE: Technical rept. Aug 85-Aug 88,

88 21P

PERSONAL AUTHORS: Ruppert,David ;Carroll,R J. ;

CONTRACT NO F49620-82-C-0009, NSF-MCS87-3129

PROJECT NO 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0408

UNCLASSIFIED REPORT

ABSTRACT: (U) The authors propose a methodology for fitting theoretical models to data. The dependent variable (or response) and the model are transformed in the same way. Two types of transformations, power transformation and weighting, are used together to remove skewness and to induce constant variance. This method is applied to the stock-recruitment data of four fish stocks. Also discussed are estimates of the conditional mean and the conditional quantiles of the original response. (Author)

DESCRIPTORS: (U) *MATHEMATICAL MODELS, *TRANSFORMATIONS(MATHEMATICS), *FISHERIES, FISHES, REGRESSION ANALYSIS, FITTING FUNCTIONS(MATHEMATICS), VARIATION, ESTIMATES, WEIGHTING FUNCTIONS, SKEWNESS, VARIABLES

IDENTIFIERS: (U) *Biomathematics, PE61102F, WUAFOSR2304A5

AD-A170 182 9/2 9/4 5/8

NORTHEASTERN UNIV BOSTON MASS DEPT OF ELECTRICAL ENGINEERING

(U) Asynchronous Finite State Machines. Simulations with Imposed Processing Constraints.

DESCRIPTIVE NOTE: Technical rept.,

APR 88 3P

PERSONAL AUTHORS: Kwonkam,S. Y. ;Kolisk[illegible],M. E. ;Miller,A. T. ;Johnson,T. L. ;

CONTRACT NO. F49620-82-C-0080

MONITOR: AFOSR
TR-88-0448

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: *Prepared in cooperation with General Electric Co., Schenectady, NY and Universite de Yoounde, Cameroun.*

ABSTRACT: (U) The action of computer control systems on continuous time discrete stots processes can be accurately represented by asynchronous finite stote machines, and, in particular, a subclass of these machines termed simple asynchronous machines, or SAMs. To understand the role that practical signal processing constraints may play in characterizing SAM behavior, a simulator capable of incorporating such constraints has been written. The architecture of this simulator and examples of its use are presented.

DESCRIPTORS: (U) *AUTOMATA, *COMPUTER APPLICATIONS, *CONTROL SYSTEMS, CONTROL SIMULATORS, DIGITAL SYSTEMS

IDENTIFIERS: (U) SAM(Simple Asynchronous Machines), PE61102F, WUAFOSR2304A1

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 177 12/1 20/11

STANFORD UNI[V] CA DEPT OF MATHEMATICS

(U) Free Bou[n]y Problems in Mechanics.

OCT 84 4P

PERSONAL AUTH[OR] Keller,Joseph B. ;

CONTRACT NO. [AF]SR-85-0007

PROJECT NO. [2]

TASK NO. A4

MONITOR: AF
TR 0471

UNCLASSIFIED REPORT

SUPPLEMENTARY [NOTE]: *Pub. in SIAM Review, v26 n4 p589-571* Oct 84.

ABSTRACT: (U) It is shown how to taper a heavy rope, hanging ver[tically], to minimize the elongation due to its own weight [and] a load at its lower end. Hooke's law is used to det[ermine] the elongation, and the calculus of variations [is] used to find that taper which minimizes it.

DESCRIPTORS: *CALCULUS OF VARIATIONS, *ROPE, SUSPENDING[(U)], ELASTIC PROPERTIES, APPLIED MECHANICS, [STATS]

IDENTIFIERS: Hookes law, Lagrange multipliers, Classical m[echanics], WUAFOSR2304A4, PE61102F

AD-A170 177

AD-A170 174 12/1

MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INFORMATION AND DECISION SYSTEMS

(U) Analysis of Simulated Annealing for Optimization.

DESCRIPTIVE NOTE: Technical rept.,

SEP 85 34P

PERSONAL AUTHORS: Gelfand,Saul B. ;Mitter,Sanjoy K. ;

REPORT NO. LIDS-P-1494

CONTRACT NO. DAAG29-82-0135, AFOSR-82-0258

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-86-0349

UNCLASSIFIED REPORT

ABSTRACT: (U) Simulated annealing is a popular Monte Carlo algorithm for combinatorial optimization. The annealing algorithm simulates a nonstationary finite state Markov chain whose state space is the domain of the cost function to be minimized. We analyze this chain focusing on those issues most important for optimization. In all of our results we consider an arbitrary partition optimization: important special cases are when I is the set of minimum cost states or a set of all states with sufficiently small cost. We give a lower bound on the probability that the chain visits I at some time. This bound may be useful even when-the algorithm does not converge. We give conditions under which the chain converges to I in probability and obtain an estimate of the rate of convergence as well. We also give conditions under which the chain visits I infinitely often visits I almost always, or does not converge to I with probability 1. (Author)

DESCRIPTORS: (U) *MONTE CARLO METHOD, *ALGORITHMS, COMBINATORIAL ANALYSIS, OPTIMIZATION, CONVERGENCE, ESTIMATES

IDENTIFIERS: (U) Simulated annealing, Markov chains,

AD-A170 174

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO EVN34M

AD-A170 174 CONTINUED

WUAFOS 2304A1, PE61102F

AD-A170 173 9/3 12/1

BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

(U) Efficient Parameter Identification for a Class of Bilinear Differential Systems.

85 6P

PERSONAL AUTHORS: Pearson,E. A. ;Lee,F. C. ;

CONTRACT NO. AFOSR-85-0300

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-86-0430

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IFAC Identification and System Parameter, p161-165 1985.

ABSTRACT: (U) Using sinusoidal probing signals on sequential time intervals of finite duration, a least squares parameter identification technique is developed for a class if bilinear differential systems which avoids the usual point-wise-in-time cross multiplication between the input-output data and avoids dealing with all unknown initial (boundary) conditions over each finite time interval. The basis of the technique is Shinbrot's method of moment functionals using commensurable sinusoids as the modulating functions. The main result is the demonstration that the sequential least squares procedure for the bilinear system parameters with sinusoidal inputs can be set up using a single Fast Fourier Transform of the output data over each finite time interval which is essentially the same computational requirement as attends the formulation for a linear system model. (Author)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *PARAMETRIC ANALYSIS, *LEAST SQUARES METHOD, IDENTIFICATION, TIME INTERVALS, FAST FOURIER TRANSFORMS, METHOD OF MOMENTS, REPRINTS

IDENTIFIERS: (U) *Bilinear differential systems, WUAFOSR2304A1, PE61102F

AD-A170 174

AD-A170 173

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 171 20/4

RENSSELAER [illegible]YTECHNIC INST TROY N Y DEPT OF MATHEMATICS

(U) Lax-Fri[illegible]ichs and the Viscosity-Capillarity Criterion.

88 12P

PERSONAL AUT[illegible]S: Slemrod,Marshall ;

CONTRACT NO. AFOSR-81 0172

PROJECT NO. 2304

TASK NO. A1

MONITOR: A[illegible]FR
T[illegible]88-0376

UNCLASSIFIED REPORT

SUPPLEMENTA[illegible]NOTE: Pub. in Physical Mathematics and Nonlinear [illegible]tial Differential Equations, p75-84 1985.

ABSTRACT: ([illegible] It has been shown by Lax some time ago that solut[illegible]s of hyperbolic conservation laws obtained as limits [illegible]the Lax-Friedrichs finite difference scheme will actu[illegible]y satisfy an 'entropy' admissibility criterion[illegible]he goal of this paper is to attempt to extend Lax's ide[illegible]to a form which is amenable to mixed problems as well, [illegible]) the dynamics of a van der Waals fluid. Specifica[illegible] the author compares shocks obtained by the Lax-Frie[illegible]s scheme with those permitted by the viscosity[illegible]illarity criterion. He shows that for isotherma[illegible]tion it is expected that shocks produced by Lax-Frie[illegible]s will satisfy the viscosity-capillarity criterion (Author)

DESCRIPTORS: (U) *COMPRESSIBLE FLOW, *ISOTHERMS, SHOCK WAVES, VI[illegible]SITY, CAPILLARITY, REPRINTS

IDENTIFIERS: (U) *Van der Waals fluids, Lax Friedrichs finite di[illegible]ference method, WUAFOSR2304A1, PE61102F

AD-A170 170 12/1

PITTSBURGH UNIV PA DEPT OF MATHEMATICS AND STATISTICS

(U) A Multivar ate Extension of Hoeffding's Lemma.

DESCRIPTIVE NOTE: Technical rept.,

NOV 85 24P

PERSONAL AUTHORS: Block,Henry W. ;Fang,Zhaoben ;

REPORT NO. TR-85-10

CONTRACT NO. N00014-84-K-0084, AFOSR-81-0113

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0410

UNCLASSIFIED REPORT

ABSTRACT: (U) Hoeffding's Lemma gives an integral representation of the covariance of two random variables in terms of difference between their joint and marginal probability functions. This identity has been found to be useful tool in studying the dependence structure of various random vectors. A generalization of this result for more than 2 random variables is given. This involves an integral representation of the multivariate joint cumulant. Applications of this result include characterizations of independence. Relationships with various types of dependence are also given. (Author)

DESCRIPTORS: (U) *MULTIVARIATE ANALYSIS, THEOREMS, RANDOM VARIABLES, COVARIANCE, DISTRIBUTION FUNCTIONS

IDENTIFIERS: (U) Hoeffdings Lemma, WUAFOSR2304A5, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 169 12/1

BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

(U) Parameter Identification of Linear Differential Systems via Fourier Based Modulating functions.

DEC 85 30p

PERSONAL AUTHORS: Pearson,A. E. ;Lee,F. C. ;

CONTRACT NO AFOSR-85-0300

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-86-0428

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Control-Theory and Advanced Technology v1 n4 p239-268 Dec 85.

ABSTRACT: (U) The parameter identification of linear differential system is considered from the viewpoint of Shinbrot's classical method of moment functionals using commensurate sinusoids as the modulating functions. This facilitates a least squares formulation in which the underlying computations require calculating a finite set of Fourier series coefficients of time limited input-output data while avoiding the necessity to estimate unknown initial conditions for a one-shot estimate, or unknown boundary conditions at each state for sequential least squares. It is noted that a fast Fourier transform algorithm can be utilized for these calculations, thus providing fast algorithms of the identification of continuous time systems. It is shown that the frequency domain interpretation can be useful in enhancing the signal to noise ratio of the modulated data in the presence of noisy measurements. A maximum likelihood estimate is developed for the stochastic case of additive white gaussian noise in the data which effectively removes the bias when the parameter identification is considered in a recursive mode. Simulation results are included to illustrate the developments. (Author)

DESCRIPTORS: (U) *LINEAR DIFFERENTIAL EQUATIONS, *PARAMETRIC ANALYSIS, REPRINTS, FAST FOURIER TRANSFORMS, MAXIMUM LIKELIHOOD ESTIMATION, LEAST SQUARES METHOD, SIGNAL TO NOISE RATIO, METHOD OF MOMENTS

IDENTIFIERS: (U) Fast algorithms, Shinbrots method, WUAFOSR2304A5, PE61102F

AD-A170 169

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 167 12/1

STANFORD [illegible] CA DEPT OF MATHEMATICS

(U) On the [illegible]bility of Inverse Scattering Problems.

84 12P

PERSONAL AU[illegible]S: Fawcett,John ;

CONTRACT NO AFOSR-85-0007

PROJECT NO. 2304

TASK NO. A4

MONITOR: A R
T [illegible]3-0455

UNCLASSIFIED REPORT

SUPPLEMENTAR[illegible]NOTE: Pub. in Wave Motion, v6 p489-499 1984

ABSTRACT: (U) Some aspects of the time-dependent inverse scattering [illegible]blems are discussed. Then some simple stability [illegible]lts are presented. Several analytical and numerical [illegible]ples are given to illustrate them. (Author)

DESCRIPTORS: (U) *INVERSE SCATTERING, STABILITY, TIME DEPENDENCE, [illegible]UMERICAL ANALYSIS, BOUNDARY VALUE PROBLEMS, REPRINTS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4

AD-A170 168 12/1

STANFORD UNIV CA DEPT OF MATHEMATICS

(U) A Rigorous Derivation of the Miracle Identity of Three-Dimensional Inverse Scattering.

OCT 84 4P

PERSONAL AUTHORS: Cheney,Margaret ;

CONTRACT NO. AFOSR-85-0007

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR
TR-86-0456

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Journal of Mathematical Physics, v25 n10 p2988-2990 Oct 84.

ABSTRACT: (U) The large energy asymptotic behavior of scattering solutions of the three dimensional time dependent Schrodinger equation is investigated. The second term of the expansion leads to the 'miracle' of Newton's three dimensional inverse scattering theory.

DESCRIPTORS: (U) *SCHRODINGER EQUATION, *SOLUTIONS(GENERAL), ASYMPTOTIC SERIES, FOURIER TRANSFORMATION, INVERSE SCATTERING, THREE DIMENSIONAL, REPRINTS

IDENTIFIEPS: (U) PE61102F, WUAFOSR2304A5

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 135 9/4

TEXAS A AND M UNIV COLLEGE STATION DEPT OF ELECTRICAL ENGINEERING

(U) Asymptotically Robust Detection of Stochastic Signals in Contaminated Noise.

MAY 86 8P

PERSONAL AUTHORS: Schnitzer,M. S. ;Halverson,D. R. ;

CONTRACT NO. AFOSR-82-0033

PROJECT NO. 2304

TASK NO. A5

MONITOR. AFOSR TR-86-0433

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at Annual Allerton Conference on Communication, Control, and Computing (23rd), 2-4 Oct 85.

ABSTRACT: (U) We consider the discrete time detection of stochastic signals in white noise, where the univariate noise density is known perfectly only on an interval about the origin. We present a method to enhance the asymptotic performance of the detector by exploiting this knowledge and at the same time preserve robustness properties of the detector to the remaining inexact knowledge of the univariate noise density via a saddle point condition. We then provide examples to show that improved performance is indeed obtained. (Author)

DESCRIPTORS: (U) *NOISE, *SIGNALS, *DETECTION, OPTIMIZATION, WHITE NOISE

IDENTIFIERS: (U) Stchastic signals, Detection(Robust), Noise(Contaminated), PE61102F

AD-A170 135

AD-A170 164 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Bayesian Nonparametric Estimation of the Median. Part 2. Asymptotic Properties of the Estimates.

85 22P

PERSONAL AUTHORS: Doss,Hani ;

REPORT NO. FSU-STATISTICS-M657, P-459

CONTRACT NO. F49620-85-C-0007, NSF-MCS80-24649

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0407

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Annals of Statistics, v13 n4 p1445-1464 1985. See also Part 1, AD-A170 122.

ABSTRACT: (U) For data theta + epsilon sub i = 1, ..., n where epsilon sub i are i.i.d. similar to F with the median of F equal to 0 but F otherwise unknown, it is desired to estimate theta. In Doss (1985) priors are put on the pair (F, theta), the marginal posterior distribution of theta is computed, and the mean of the posterior is taken as the estimate of theta. In this paper a frequentist point of view is adopted. The consistency properties of the bayes estimates computed in Doss (1985) are investigated when the prior on F is of the Dirichlet-type. Any F whose median is 0 is in the support of these priors. It is shown that if the epsilon sub i are i.i.d. from a discrete distribution, then the Bayes estimates are consistent. However, if the distribution of the epsilon sub i's is continuous, the Bayes estimates can be inconsistent. (Author)

DESCRIPTORS: (U) *NONPARAMETRIC STATISTICS, *ESTIMATES, BAYES THEOREM, CONSISTENCY, ASYMPTOTIC NORMALITY, DISCRETE DISTRIBUTION, REPRINTS

IDENTIFIERS: (U) Median, Continuous distribution, PE61102F

AD-A170 164

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 161 12/1

NORTH C[illegible]NA STATE UNIV AT RALEIGH DEPT OF MATHEMATICS

(U) Rank[illegible]icient Least Squares and the Numerical Solu[illegible] of Linear Singular Implicit Systems of Diffe[illegible]tial Equations.

8P[illegible] 14P

PERSONAL A[illegible]ORS: Campbell,Stephen L. ;

CONTRACT N[illegible] AFOSR-84-0240, (NSF)-(DMS)83-18026

PROJECT NO 2304

TASK NO. [illegible]5

MONITOR: [illegible]R
[illegible]84-0420

UNCLASSIFIED REPORT

SUPPLEMENT[illegible]Y NOTE: Pub. in Contemporary Mathematics, v47 p81-83 1[illegible]5

ABSTRACT: [illegible] An approach for the numerical solution of linear s[illegible]ms of differential equations of the form A(t) x'(t) + [illegible]x(t) = f(t) with A(t) singular is discussed. The key [illegible] in this approach is the solution of a rank deficie[illegible]east squares problem. The solution of this least s[illegible]es problem is investigated. These results are then ap[illegible]d to the system of differential equations. (Author)

DESCRIPTOR[illegible] (U) *LEAST SQUARES METHOD, LINEAR SYSTEMS, PARTIAL [illegible]FERENTIAL EQUATIONS, SOLUTIONS(GENERAL), REPRINTS

IDENTIFIER[illegible] (U) PE61102F

AD-A170 162 17/2 14/4

CLEMSON UNIV SC

(U) Exact and Approximate Dependent Failure Reliability Models for Telecommunications Networks.

MAR 85 8P

PERSONAL AUTHORS: Shier,D. R. ;Spragins,J. D. ;

CONTRACT NO. AFOSR-84-0154

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0341

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Proceedings INFOCOM '85, p200-205, 26-28 Mar 85.

ABSTRACT: (U) Previous papers by one of the authors have presented both an exact, but computationally slow, method for computing the reliability of telecommunication networks with dependent failures and a much faster approximation to this method. Both methods are based on using parameters that capture the statistical dependencies and that are intuitive and reasonably easy to measure. This paper extends such previous work by giving a considerably more efficient approach to the calculations for the exact case plus a new series of approximations which converge to the exact solution. (Author)

DESCRIPTORS: (U) *TELECOMMUNICATIONS, *COMMUNICATIONS NETWORKS, *RELIABILITY, APPROXIMATION(MATHEMATICS), MODELS, REPRINTS

IDENTIFIERS: (U) Exact Solutions, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 [illegible] 12/1

BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYST[illegible]

(U) Limiting Behavior of Linearly Damped Hyperbolic Equations.

JAN 86 43P

PERSONAL AUTHORS: Hale,Jack K. ;Stavrakakis,Nicholas ;

REPORT NO. LCDS-86-6

CONTRACT NO DAAG-29-83-K-0029, AFOSR-84-0378

PROJECT NO 2304

TASK NO A1

MONITOR AFOSR TR-86-0373

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by Grant NSF-DMS85-07058

ABSTRACT (U) For a linearly damped wave equation in a bounded domain in R sub n, it is shown that there is a compact attractor in H 1st power x L to the 2nd power as well as in (H to the 2nd power intersection H sub 0 to the 1st power) x H sub 0 to the 1st power. Similar results are given for the linearly damped beam equation. (Author)

DESCRIPTORS (U) *LINEAR DIFFERENTIAL EQUATIONS, *WAVE EQUATIONS, DAMPING, BANACH SPACE, OPERATORS(MATHEMATICS), THEORY.

IDENTIFIERS (U) *Hyperbolic differential equations, Beam equations, Compact attractors, Semigroups(Mathematics), PE61102F

AD-A170 [illegible]

AD-A170 150 21/2 21/1

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF MECHANICAL ENGINEERING

(U) Large Eddy Structures in Transitional and Turbulent Flames.

DESCRIPTIVE NOTE: Final rept. 1 Jul 82-30 Jun 85,

AUG 85 74P

PERSONAL AUTHORS: Chigier,Norman ;

CONTRACT NO. AFOSR-82-0266

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR TR-86-0499

UNCLASSIFIED REPORT

ABSTRACT: (U) An experimental investigation of transitional and turbulent jet diffusion flames was carried out with emphasis on the derivation of time-dependent information from measurements of various fluctuating quantities in these flames. Special efforts were made to control carefully, and vary systematically, the initial and boundary conditions of each flame. Mapping of the signal reveals that the inner flame boundary moves radially outward in the near flow-field (x/D=10 to x/D=40) and later converges toward the flame axis. Meanwhile, the outer flame boundary grows steadily with downstream (axial) distance, indicating a consistently widening reaction zone, for the entire area examined (x/D=10 to x/D=60). Profiles of RMS values of ion current were correlated with flame boundary locations. A double peak pattern was found in the RMS profiles, each peak coinciding with the large gradients of the mean ion current profiles. Near the inner flame boundary, the flame front fluctuates across the probe's sampling volume, generating largely fluctuating components of ion current. In the central flame region, the probe experiences a more continuous flame presence and less fluctuations. This causes the mean ion current signal to remain high while the RMS signal drops off rather rapidly. As the outer flame boundary is approached, an increase in fluctuations

AD-A170 150

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 1[illegible] CONTINUED

again t[illegible] place.

DESCRIPT[illegible] (U) *JET FLAMES, EDDIES(FLUID MECHANICS), TURBUL[illegible]FFUSION, MAPPING, BOUN[illegible]DARIES, TRANSITIONS, TURBUL[illegible]W, JET MIXING FLOW, AIR FLOW, ATTACHMENT, FLOW V[illegible]ZATION, IONIC CURRENT, POWER SPECTRA, FAST FOURIE[illegible]FORMS, LASER ANEMOMETERS, DOPPLER SYSTEMS, SAMPLI[illegible]RE DEPENDENCE, METHANE, PROPANE

IDENTIFIE[illegible] (U) Jet diffusion flames, Transitional jet flames, [illegible]1102F, WUAFOSR2308A2

AD-A170 145 12/1

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

(U) Regenerative Sampling and Monotonic Branching Processes.

DESCRIPTIVE NOTE: Technical rept.,

MAY 86 30P

PERSONAL AUTHORS: Durham,Stephen D. ;Yu,Kai F. ;

REPORT NO. TR-118

CONTRACT NO. AFOSR-84-0158

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0429

UNCLASSIFIED REPORT

ABSTRACT: (U) A regenerative sampling plan is proposed for the sequential comparison of two populations having positive integral response. It is designed to be both an extension and an improvement of the play-the-winner rules for binary trials in the sense that a much wider variety of responses is allowed, the fraction of inferior selections approaches zero, and th play-the-winner rule is contained as a special cse. Almost sure convergence and moment convergence in the pth order is studied for the fraction of inferior selections and for a maximum likelihood estimator of the mean response. A conditional test of hypothesis is given for the binary case. (Author)

DESCRIPTORS: (U) *STATISTICAL SAMPLES, POPULATION(MATHEMATICS), SELECTION, RANDOM VARIABLES, ESTIMATES, INTEGRALS, COMPARISON

IDENTIFIERS: (U) Play the winner rule, PE81102F, WUAFOSR2304A5

AD-A170 15[illegible]

AD-A170 145

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 144 12/1

MARYLAND UNIV BALTIMORE COUNTY BALTIMORE DEPT OF MATHEMATICS

(U) The h-p Version of the Finite Element Method with Quasi-Uniform Meshes.

DESCRIPTIVE NOTE: Summary rept.,

MAY 86 64P

PERSONAL AUTHORS: Babuska,Ivo ;Suri,Manil ;

REPORT NO MRR-86-1

CONTRACT NO AFOSR-85-0322, NSF-DMS83-15216

PROJECT NO 2304

TASK NO. A3

MONITOR: AFOSR TR 86-0362

UNCLASSIFIED REPORT

ABSTRACT (U) The classical error estimates for the h-version of the finite element method are extended for the h-p version. The estimates are expressed as explicit functions of h and p are shown to be optimal. The estimates are given for the case where the solution u (H sub k a) the case when u has singularities at the corners of the domain. (Author)

DESCRIPTORS (U) *FINITE ELEMENT ANALYSIS, *ESTIMATES, ERROR ANALYSIS, MESH, OPTIMIZATION, CONVERGENCE, POLYGONS, POLYNOMIALS

IDENTIFIERS (U) PE61102F, WUAFOSR2304A3

AD-A170 144

AD-A170 138 11/6

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF MATERIALS SCIENCE

(U) The Use of Novel Processing Procedures for Improving Overall Fatigue Resistance of High Strength Aluminum Alloys.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 85,

APR 86 105P

PERSONAL AUTHORS: Starke,Edgar A. , Jr;

REPORT NO. UVA/525644/MS86/101

CONTRACT NO. AFOSR-83-0061

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR TR-86-0492

UNCLASSIFIED REPORT

ABSTRACT: (U) Its objective is to develop an understanding of the mechanisms involved in the initiation and propagation of cracks in metals in order to optimize the microstructure of high strength aluminum alloys for overall fracture resistance. The research conducted during this year was divided into three tasks. Task I was concerned with the effects of slip character and grain size on the intrinsic material and extrinsic closure contributions to fatigue crack growth resistance of 7475. It involved the use of thermomechanical processing to modify the grain structure for enhancement of both intrinsic and extrinsic effects. In our last report we described the use of a direct current potential drop technique (DC-PD) to examine the possibility of crack tip welding in vacuum and the results of our initial experiments using this method. Task II was concerned with a study of the fatigue crack growth and fracture mechanisms of an Al-Li-Cu alloy. Task III was concerned with secondary cracking in Al-Li-Cu, Al-Li-Mg and Al-Li-Cu-Mg alloys. Many recent studies of this class of alloys have shown that they can exhibit severe grain boundary cracking. The most commonly-observed manifestation of this cracking is the appearance of

AD-A170 138

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 136 CONTINUED

secondary cracks on fracture surfaces of tensile specimens loaded parallel to the rolling direction.

DESCRIPTORS: (U) *CRACK PROPAGATION, *HIGH STRENGTH ALLOYS, *[illegible]INUM ALLOYS, FRACTURE(MECHANICS), RESISTANCE, FATIGUE([illegible]NICS), THERMOMECHANICS, *GRAIN STRUCTURE([illegible]TALLURGY), GRAIN SIZE, GROWTH(GENERAL), LITHIUM ALLOYS, COPPER ALLOYS, TOUGHNESS, MAGNESIUM ALLOYS

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A1

AD-A170 128 20/5 14/2

CITY COLL NEW YORK ULTRAFAST SPECTROSCOPY AND LASER LAB

(U) Picosecond and Femtosecond Spectroscopic Instrumentation for Ultrafast Spectroscopy and Lasers.

DESCRIPTIVE NOTE: Final rept. 14 Dec 84-31 Dec 85,

MAR 86 8P

PERSONAL AUTHORS: Alfano,Robert R. ;

CONTRACT NO. AFOSR-85-0055

PROJECT NO. 2917

TASK NO. A3

MONITOR: AFOSR TR-86-0498

UNCLASSIFIED REPORT

ABSTRACT: (U) The Institute has acquired state-of-the-art ultrafast lasers and diagnostic instrumentation to upgrade its facilities and capabilities. A femtosecond mode locked CPM dye laser - dye amplifier system was substantially improved by the addition of new YAG laser pump. This femtosecond system will be used in the study of ultrafast processes in semiconductor microstructures and alloys. A multichannel Raman spectroscopic system was installed for use in the study of transient Raman effect in semiconductors and shock wave induced processes. An ultrafast streak camera was acquired for photoluminescence kinetic studies in semiconductor alloys and microstructures with a time resolution of 2 ps.

DESCRIPTORS: (U) *MODE LOCKED LASERS, *LASER PUMPING, *DYE LASERS, YAG LASERS, LABORATORY EQUIPMENT, LASER AMPLIFIERS, OPTICAL DETECTORS, MULTICHANNEL, PULSED LASERS, STREAK CAMERAS, TIME STUDIES, RAMAN SPECTRA

IDENTIFIERS: (U) Femtosecond time, Ultrafast spectroscopy, Picosecond time, PE61102F, WUAFOSR2917A3

OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 125 8/16 14/2 9/3 12/1

PURDUE UNIV LAFAYETTE IN EEG SIGNAL PROCESSING LAB

(U) Detection, Estimation, and Multidimensional Processing of Sig s Evoked Potentials.

DESCRIPTIVE NOTE: Final rept. 1 May 83-30 Apr 85,

SEP 85 147P

PERSONAL AUTHORS: Aunon,J. I. ;McGillem,C. D. ;

CONTRACT NO. F49620-83-K-0031

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-86-0387

UNCLASSIFIED REPORT

ABSTRACT: (U) A new method of generating and selecting features for computer classification of ERP waveforms is describe The technique employs features that are time samples of measured ERP waveforms that have been bandpass filtered An improvement of more conventional techniques is shown with both simulated and measured data. A comparis n of performance of a quadratic classifier with optimum feature selection is made with one using (suboptimal) forward segmented feature selection. Details of the design and performance are presented for an optimum time-varying filter for estimating ERP waveforms. The filt accepts inputs from multiple electrodes and generates an estimate for the waveform at a single electro Results for both simulated and measured data are pre ed. Some preliminary studies of artifact generat in ERP waveforms are described

DESCRIPTO (U) *SIGNAL PROCESSING, *ESTIMATES, *PATTE COGNITION, BANDPASS FILTERS, ELECTRO PHALOGRAPHY, DETECTION

IDENTIFIE (U) Feature selection, Multidimensional process ERP(Event Related Potentials), Evoked potenti S PE61102F, WUAFOSR2313A4

AD-A170 125

AD-A170 122 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Bayesian Nonparametric Estimation of the Median. Part 1. Computation of the Estimates,

85 14P

PERSONAL AUTHORS: Doss,Hani ;

CONTRACT NO. F49620-85-C-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0406

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Annals of Statistics, v13 n4 p1432-1444 1985.

ABSTRACT: (U) Let X sub i = 1,..., n be i.i.d. approximately F sub theta where F sub theta(x) = F(x-theta) for some F that has median equal to 0.F is assumed unknown or only partially known, and the problem is to estimate theta. Priors are put on the pair (F, theta). The priors on F concentrate all their mass on c.d.f.s. with median equal to 0. These priors include 'Dirichlet-type' priors. The marginal posterior distribution of *theta given* X sub 1,..., X sub n is computed. The mean of the posterior is taken as the estimate of theta. (Author)

DESCRIPTORS: (U) *NONPARAMETRIC STATISTICS, *ESTIMATES, COMPUTATIONS, BAYES THEOREM, REPRINTS

IDENTIFIERS: (U) *Medium(Statistics), PE61102F, WUAFOSR2304A5

AD-A170 122

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 115 12/1

MISSOURI U AT ROLLA DEPT OF MATHEMATICS AND STATISTICS

(U) Statistical Analysis of a Compound Exponential Failure Model.

86 16P

PERSONAL AUTHORS: EngelHardt,Max ;Bain,Lee J. ;

CONTRACT NO AFOSR-84-0164

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0378

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Statistical Computation and Simulation, v23 p299-315 1986.

ABSTRACT: (U) This paper discusses the statistical analysis of a two parameter compound exponential failure model. Some computational aspects of estimating both parameters by the method of maximum likelihood are discussed and small-sample means and variances are derived. Tests of hypotheses on each parameter with the other parameter an unknown nuisance parameter are provided, and the construction of confidence limits are discussed. (Author)

DESCRIPTORS: (U) *PARAMETRIC ANALYSIS, *EXPONENTIAL FUNCTIONS, MAXIMUM LIKELIHOOD ESTIMATION, MATHEMATICAL MODELS, CONFIDENCE LIMITS, REPRINTS

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F

AD-A170 115

AD-A170 112 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) Stochastic Convexity and Its Applications.

DESCRIPTIVE NOTE: Technical rept.,

DEC 85 35P

PERSONAL AUTHORS: Shaked,Moshe ;Shanthikumar,J. G. ;

CONTRACT NO. AFOSR-84-0205

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0345

UNCLASSIFIED REPORT

ABSTRACT: (U) Several notions of stochastic convexity and concavity and their properties are studied in this paper. Efficient sample path approaches are developed in order to verify the occurrence of these notions in various applications. Numerous examples are given. The use of these notions in several areas of probability and statistics is demonstrated. In queueing theory, the convexity (as a function of c) of the steady state mean waiting time in a GI/D/c queue, and as a function of the arrival and service rates in a GI/G/1 queue, is established. Also the convexity of the queue length in the M/M/c case as a function of the arrival rate is shown, thus strengthening previous results while simplifying their derivation. In reliability theory, the convexity of the payoff on the success rate of an imperfect repair is obtained and used to find an optimal repair probability. Also the convexity of the damage as a function of time in a cumulative damage shock model is shown. In branching processes, the convexity of the population size as a function of a parameter of the offspring distribution is proved. In nonparametric statistics, the stochastic concavity (convexity) of the empirical distribution function is established. And, for applications in the theory of probability inequalities, we identify several families of distributions which are convexly parametrized.

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, ARRIVAL,

AD-A170 112

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 112 CONTINUED

DISTRI[illegible]TION FUNCTIONS, INEQUALITIES, MEAN, NONPARAMETRIC STATIS[illegible]S, OPTIMIZATION, PROBABILITY, QUEUEING THEORY, RATES, [illegible]IABILITY, REPAIR, SIZES(DIMENSIONS), STEADY STATE, [illegible]ORY, TIME DEPENDENCE, POPULATION(MATHEMATICS)

IDENTIFI[illegible]S: (U) *Convexity, Concavity, WUAFOSR2304A5, PE61102F

AD-A170 111 9/2

TEXAS UNIV AT AUSTIN DEPT OF COMPUTER SCIENCES

(U) Dynamic, Distributed Resource Configuration on SW-Banyans.

DESCRIPTIVE NOTE: Final rept. 1 Feb 84-31 Jan 85, 85 6P

PERSONAL AUTHORS: Feo,John ;Jenevein,Roy ;Browne,J. C. ;

CONTRACT NO. F49620-84-C-0020

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR TR-86-0462

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE, p268-273 1985.

ABSTRACT: (U) A distributed, Log N algorithm to configure computer resources interconnected by regular SW-banyans into logical SISD machines is presented. The algorithm is written for a general, dynamic computing environment in which requests for resources and the release of allocated resources occur spontaneously. A request is always satisfied assuming it is physically possible to do so. The circuit built is the cheapest realization of the request in terms of network connectivity.

DESCRIPTORS: (U) *CONFIGURATIONS, *COMPUTER ARCHITECTURE, ALGORITHMS, DISTRIBUTION, ENVIRONMENTS, NETWORKS, RESOURCES, MULTIPROCESSORS, REPRINTS

IDENTIFIERS: (U) *Banyans, WUAFOSR2304A3, PE61102F

DTIC REPORT BIBLIOGRAPHY. SEARCH CONTROL NO. EVN34M

AD-A170 110 12/1

GEORGIA I ..T OF TECH ATLANTA

(U) Optim.. Idle and Inspection Periods for M/G/1 Queues.

MAR 86 13P

PERSONAL AU ..RS: Kim,Sung S. ;Serfozo,Richard F. ;

CONTRACT NO AFOSR-84-0367

PROJECT NO. 2304

TASK NO. A5

MONITOR: ..R
..83-0382

UNCLASSIFIED REPORT

ABSTRACT: (U) We consider an M/G/1 queue that operates under a (T,N) policy: whenever the system becomes empty, the serve.. is idle for a time T and then it inspects the queue con.. ..ously without serving customers until there are N cus.. ..rs waiting - thereupon the server is activated .. service and serves customers continuously until the ..stem becomes empty. This idle-inspection-service c.. ..e is repeated indefinitely. There are costs for inspe.. ..g the queue, activating and running the server, a.. ..olding customers in the system. We present a computati.. ..l procedure for determining the design parameters (T,N) that minimizes the average cost.

DESCRIPTORS (U) *QUEUEING THEORY, COMPUTATIONS, COSTS, POLICY, PA..METERS, NUMERICAL METHODS AND PROCEDURES

IDENTIFIERS. (U) WUAFOSR2304A5, PE61102F

AD-A170 110

AD-A170 109 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Stationary Markov Sets.

DESCRIPTIVE NOTE: Technical rept.,

APR 86 39P

PERSONAL AUTHORS: Taksar,Michael I. ;

REPORT NO. FSU-STATISTICS-M705, TR-86-187-AFOSR

CONTRACT NO. F49620-85-C-0007

PROJECT NO. 2304

MONITOR: AFOSR
TR-86-0366

UNCLASSIFIED REPORT

ABSTRACT: (U) A Markov set is a random set on a real line whose 'future' shape is conditionally independent of the 'past' shape given 'present'. Such sets appear in the study of visiting times of special Markov (but not strong Markov) processes. If the Markov process is stationary then the corresponding set is also stationary, that is, its distribution does not depend on the choice of the origin on the real line. In this paper we will describe all closed stationary Markov sets. We will show that each stationary Markov which is not regenerative can be constructed from two special regenerative sets by either taing a mixture of these regenerative sets or taking a 'Superposition' of two regenerative sets. Superposition can be described loosely as cuttingtwo real lines R1 and R2 with two sets M1 and M2 in them, into pieces of iid length and then combine them into one line alternating pieces from R1 and R2. The union of the cut offs from M1 and M2 will be the superposition of the sets M1 and M2.

DESCRIPTORS: (U) *MARKOV PROCESSES, *SET THEORY, REGENERATION(ENGINEERING), MATHEMATICAL FILTERS, MAPPING(TRANSFORMATIONS), REPRINTS

IDENTIFIERS: (U) PE61102F

AD-A170 109

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 101 12/1 14/4 14/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Testing Whether F is 'More NBU (New Better Than Used)' Than G.

86 6P

PERSONAL AUTHORS: Hollander,Myles ;Park,Dong H. ;Proschan, Frank ;

CONTRACT NO F49620-85-C-0007

PROJECT NO 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0364

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Microelectronic Reliability, v26 n1 p41-44 1986.

ABSTRACT: (U) This paper develops a test to decide whether one life distribution possess more of the new better than used (NBU) property than does a second life distribution. We also extend the test to compare more than two life distributions as to their degree of NBU-ness.

DESCRIPTORS: (U) *LIFE TESTS, *STATISTICAL ANALYSIS, PROBABILITY DISTRIBUTION FUNCTIONS, ASYMPTOTIC SERIES, MAINTENANCE, COST ANALYSIS, RELIABILITY, REPRINTS

IDENTIFIERS: (U) NBU(New Better Than Used), WUAFOSR2304A5, PE61102F

AD-A170 099 9/2

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) A General Software Availability/Reliability Model: Numerical Exploration via the Matrix Laguerre Transform.

DESCRIPTIVE NOTE: Technical rept.,

DEC 84 35P

PERSONAL AUTHORS: Masuda,Yasushi ;Shanthikumar,J. G. ; Sumita,Ushio ;

CONTRACT NO. AFOSR-84-0208, NSF-ECS84-04071

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0402

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper, a new software availability/reliability model is developed where lifetimes and repair times have general system-state-dependent distributions. Multiple errors may be introduced or removed through repairs. The model is formulated as a multivariate Markov process and contains many other models appeared in the literatures as special cases. The exponentiality assumption prevalent in the literature is totally eliminated. Expressions of various performance measures of practical interest combining availability and reliability of the software system at time t are derived. Using the matrix Laguerre transform of Sumita (1984), corresponding computational procedures are also developed. A numerical example is given, demonstrating speed, accuracy and stability of these procedures. (Author)

DESCRIPTORS: (U) *COMPUTER PROGRAM RELIABILITY, REPAIR, AVAILABILITY, MULTIVARIATE ANALYSIS, MARKOV PROCESSES, LAGUERRE FUNCTIONS, TRANSFORMATIONS(MATHEMATICS)

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 087 9/2

TEXAS UNIV AT AUSTIN DEPT OF COMPUTER SCIENCES

(U) TRAC (Texas Reconfigurable Array Computer): An Experience with a Novel Architectural Prototype.

DESCRIPTIVE NOTE: Final rept. 1 Feb 84-31 Jan 85.

85 13P

PERSONAL AUTHORS: Deshpande,S. R. ;Jenevein,R M. ; Lipovski,G. J. ;

CONTRACT NO. F49620-84-C-0020

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR TR-87-0458

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in National Computer Conference p247-258 1985

ABSTRACT: (U) This paper presents a self-assessment of the Texas Reconfigurable Array Computer (TRAC) Project. Architectural decisions and implementation schemes are examined, and detail is focused on elements such as processor-to-memory design, along with the structure of the interconnection networks. Communication issues concerning circuit vs. packet switching and system synchronization are reviewed. Various test and debugging tools employed during the implementation phase are covered. Finally, now that TRAC is operational, overall positive and negative aspects of the design decision are summarized. (Author)

DESCRIPTORS: (U) *COMPUTER ARCHITECTURE, SYSTEMS ANALYSIS, PROTOTYPES, DEBUGGING(COMPUTERS), CIRCUIT INTERCONNECTIONS, REPRINTS

IDENTIFIERS: (U) TRAC(Texas Reconfigurable Array Computer), MU/AFOSR2304A3, PE61102F

AD-A170 095 7/3 20/2

NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

(U) Structure of 6,6,10,10-Tetranitropentacyclo(5.3.0.0 superscript 2,5.0 superscript 3,9.0 superscript 4,8) decane, C10H8N4O8.

85 5P

PERSONAL AUTHORS: George,Clifford ;Gilardi Richard ; Flippen-Anderson,Judith L. ;Choi,Chang S ;Prichard,Alan P. ;

CONTRACT NO. AFOSR-84-0085

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-88-0368

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Acta Crystallographica, Section C, vC41 p788-791 1985.

ABSTRACT: (U) The title compound, a tetranitrobishomocubane (TNBHC), was prepared as part of a program to synthesize strained energetic compounds. The structure and synthesis of a trinitrobishomocubane have been reported previously. The structure of this compound was investigated as part of a continuing study of the structural parameters of energetic substituents in polycyclic nitro compounds. The structural parameters provide a basis to evaluate and modify the semi-empirical parameters used for computational modelling of proposed but not yet synthesized compounds.

DESCRIPTORS: (U) *CRYSTAL STRUCTURE, *DECANES, *POLYCYCLIC COMPOUNDS, *NITRO RADICALS, ENERGETIC PROPERTIES, CRYSTAL LATTICES, REFLECTION, THERMAL PROPERTIES

IDENTIFIERS: (U) Cubanes, Cubane/tetranitrobishomo, X ray crystallography, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 094 12/1

MARYLAND U :V COLLEGE PARK DEPT OF MATHEMATICS

(U) A Fast ...phical Goodness of Fit Test for Time Series Models

DESCRIPTIVE ...TE: Technical rept.,

AUG 85 20P

PERSONAL AU...RS: Kedem,Benjamin ;

REPORT NO. ...0-85-38-BK, TR85-32

CONTRACT NO AFOSR-82-0187

PROJECT NO. 2304

TASK NO. ...

MONITOR: ...SR
...-88-0274

UNCLASSIFIED REPORT

ABSTRACT: ...(U) The oscillatory appearance of stationary time ser... is captured very economically by only a few higher o... crossings which in addition contain a great deal of ... spectral content of the process. A useful approxim... to the variances of higher order crossings is discu... and is applied in construction of probabil... limits for the hypothesized higher order crossing... From this, a graphical display of higher order crossing... gether with their probability limits provide a fast g... ss of fit test. Examples illustrate the applicab...ity of this device. (Author)

DESCRIPTOR... (U) *FITTING FUNCTIONS(MATHEMATICS), *TIME SERIES A...YSIS, STATIONARY, APPROXIMATION(MATHEMATICS), PROBABIL..., MATHEMATICAL MODELS

IDENTIFIER... (U) *Goodness of fit tests, Higher order crossing..., PE61102F, WUAFOSR2304A5

AD-A170 082 12/1

ILLINOIS UNIV AT CHICAGO CIRCLE DEPT OF MATHEMATICS STATISTICS AND COMPUTER SCIENCE

(U) A Family of Locally Resistant Nonsymmetric Bib Designs of Degree k.

DESCRIPTIVE NOTE: Interim rept.,

FEB 86 12P

PERSONAL AUTHORS: Hedayat,A. ;Ohmori,H. ;

REPORT NO. RR-86-01

CONTRACT NO. AFOSR-85-0320

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0408

UNCLASSIFIED REPORT

ABSTRACT: (U) The existence of a symmetric BIB(4t+3, 2t+1, t) design implies the existence of a locally resistant BIB(4t+4, 8t+8, 4t+3, 2t+2, 2t+1) design of degree 2t+2. There are infinite number of such designs. Such designs are useful for running experiment under hostile circumstances where there are good chance of losing one or more observations. Such designs will preserve the statistical optimality of the data. Other theoretical results are also given. (Author)

DESCRIPTORS: (U) *EXPERIMENTAL DESIGN, SYMMETRY, STATISTICAL DATA, OPTIMIZATION, MATRICES(MATHEMATICS)

IDENTIFIERS: (U) BIB(Balanced Incomplete Block), PE61102F, WUAFOSR2304A5

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 C[illegible] 12/1 12/2

ILLINOI[illegible]NIV AT CHICAGO CIRCLE DEPT OF MATHEMATICS STATISTI[illegible] AND COMPUTER SCIENCE

(U) Opti[illegible] Allocation of Multistate Components.

DESCRIPTIV[illegible] NOTE: Technical rept.,

SEP 85 14P

PERSONAL [illegible]RS: El-Neweihi,Emad ;P[illegible]oschan,Frank ; Sethura[illegible] Jayaram ;

REPORT NO TR-85-4

CONTRACT [illegible] AFOSR-80-0170

PROJECT N[illegible] 2304

TASK NO. A5

MONITOR: [illegible]SR [illegible]88-0424

UNCLASSIFIED REPORT

ABSTRACT: [illegible] This paper presents some results in the optimal [illegible]cation of multistate components to k series systems [illegible]that some performance characteristic like expecte[illegible]ber of sys[illegible]ems function[illegible]ng at level alpha or higher, [illegible] probability that at least one of the systems functio[illegible]t level apha or higher, etc. is maximized. Our basic m[illegible]atical tools are majorization and Schur functio[illegible] These results may be used to obtain fruitful applica[illegible]s in reliability theory.

DESCRIPTO[illegible] (U) *RELIABILITY, *OPTIMIZATION, *MATHEM[illegible]AL ANALYSIS, ALLOCATIONS

IDENTIFIE[illegible] (U) Schur functions, Majorization, PE61102F, WUAFOSR[illegible]A5

AD-A170 079 12/1

CALIFORNIA UNIV RIVERSIDE DEPT OF STATISTICS

(U) Influential Nonegligible Parameters under the Search Linear Model.

DESCRIPTIVE NOTE: Interim rept.,

APR 86 18P

PERSONAL AUTHORS: Ghosh,Subir ,

CONTRACT NO. AFOSR-86-0048

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0438

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper some results useful in detecting the Influential Nonegligible parameters under the search linear model are presented. An estimator of the number of nonnegligible parameters which are significant and influential is also given. Keywords: factorial experiments; residuals. (Author)

DESCRIPTORS: (U) *PARAMETRIC ANALYSIS, *FACTORIAL DESIGN, ESTIMATES, MATHEMATICAL MODELS, LINEARITY, RESIDUALS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

AD-A170 081

AD-A170 078

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 [illegible] 8 12/1

PITTSB[illegible] UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) On [illegible]ngly Consistent Estimates of Regression Coe[illegible]ents when the Errors are not Independently and Ide[illegible]ally Distributed.

MAR 88 28P

PERSONAL [illegible]THORS: Wu,Yuehua ;

REPORT N[illegible] TR-88-08

CONTRACT [illegible] F49320-85-C-0008

PROJECT N[illegible] 2304

TASK NO. A5

MONITOR: [illegible]OSR
[illegible]-88-0383

UNCLASSIFIED REPORT

ABSTRACT: [illegible]) In this paper, the author proposes two methods [illegible] estimation of the regression coefficients when the err[illegible] are not distributed identically and indepe[illegible]ly and are of nonzero mean. The estimates provid[illegible] this paper are shown to be strongly consist[illegible] and mean square consistent.

DESCRIPT[illegible] (U) *ESTIMATES *NUMERICAL METHODS AND PROCED[illegible] *COEFFICIENTS, DISTRIBUTION, LINEAR REGRES[illegible]NALYSIS, MATHEMATICAL MODELS, CHEBYSHEV APPROX[illegible]NS, CORRELATION, ERRORS, CONSISTENCY

IDENTIFIE[illegible] (U) WUAFOSR2304A5, PE81102F

AD-A170 072 8/13 8/11 20/1[illegible]

APPLIED RESEARCH ASSOCIATES INC ALBUQUERQUE NM

(U) Computational Aspects of the ARA Three Invariant Constitutive Model.

DESCRIPTIVE NOTE: Final rept. 1 Aug 84-31 Jul 85,

MAY 88 134P

PERSONAL AUTHORS: Dass,William C. ;Merkle,Douglas H. ;

REPORT NO. 5934

CONTRACT NO. F49620-84-C-0066

PROJECT NO. 2307

TASK NO. C1

MONITOR: AFOSR
TR-88-0483

UNCLASSIFIED REPORT

ABSTRACT: (U) The three invariant elastoplastic constitutive model has been implemented for use in finite difference blast and shock calculations. The model employs two yield surfaces with an independent plastic potential to control shear induced dilatancy. The model is conceptually similar to Lade's cohesionless soil model. Several improvements in the original ARA model have been incorporated during the course of implementation including tensile strength, expansive strain tracking during tensile failure, optional elimination of work softening, and a high pressure-temperature equation of state. Strain subcycling has been used to prevent violation of the consistency condition. Results are given for planar, spherical, and cylindrical one dimensional wave propagation, and are compared with results using several other currently available constitutive models. Two dimensional DIHEST calculation results are also shown. These calculations employed a newly developed interface between the Soil Element Model (SEM) subroutines and STEALTH 2D. This approach allows the SEM to act as a central bank of material models for potentially any number of continuum codes. Overall, the new constitutive model is physically realistic, somewhat expensive to run, and promising for future application. Steps which remain

AD-A170 [illegible]

AD-A170 072

AD-A170 072 ...TINUED

to make the ...l more useful in practice include parameter s... tivity studies to help dynamic insitu behavior pr... tion, improved algorithms for eliminating numerical e... a rezoning procedure, and more two dimensional ... ulation-1 experience.

DESCRIPTORS: ... *SOIL MECHANICS, *SOIL MODELS, *SEISMIC WAVES, WAVE ... AGATION, BLAST WAVES, SHOCK WAVES, FINITE DIFFERENCE T... Y, TENSILE STRENGTH, FAILURE(MECHANICS), TWO DIMENSI... ALGORITHMS, ALLUVIUM

IDENTIFIERS: ... SEM(Soil Element Model), PE61102F, WUAFOSR2307...

AD-A170 071 20/4 21/2

GEORGIA INST OF TECH ATLANTA SCHOOL OF AEROSPACE ENGINEERING

(U) Evaluation of Data on Simple Turbulent Reacting Flows.

DESCRIPTIVE NOTE: Interim scientific rept. 1 Oct 84-30 Sep 85,

SEP 85 478P

PERSONAL AUTHORS: Strahle,Warren C. ;Lekoudis,Spyridon G. ;

CONTRACT NO. AFOSR-83-0356

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR TR-85-0880

UNCLASSIFIED REPORT

ABSTRACT: (U) A large number of data sets on simple turbulent reacting and non-reacting flows are reviewed with a view toward judgement as to their suitability for computational test. Both premixed and nonpremixed flows are considered, but the review is limited to simple geometries and flows which could be analytically treated as an initial value (parabolic) problem. Nine flows are identified as being sufficiently well documented and understood to serve as bases for testing of computational methods and models. The data for these flows are tabulated or graphically displayed in this report.

DESCRIPTORS: (U) *TURBULENT FLOW, *COMBUSTION, BOUNDARY LAYER FLOW, SHEAR PROPERTIES, REYNOLDS NUMBER, FLAMES, PRESSURE GRADIENTS, JET FLOW, DATA REDUCTION, TABLES(DATA), GRAPHS

IDENTIFIERS: (U) Initial value problems, Premixed combustion, PE61102F, WUAFOSR2308A1

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 070 5/10 6/18 6/19

BERNARD M BARUCH COLL NEW YORK PSYCHOPHYSIOLOGY LAB

(U) Psychophysiological Studies II. Performance and Physiological Response in Coronary Prone and Noncoronary Prone Individuals.

DESCRIPTIVE NOTE: Final rept. 1 Nov 84-31 Oct 85,

JAN 88 84P

PERSONAL AUTHORS: Andreassi,John L. ;Juszczak,N. Mauro ;

CONTRACT NO AFOSR-83-0304

PROJECT NO 2313

TASK NO A4

MONITOR: AFOSR TR-88-0491

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A151 018

ABSTRACT: (U) This final report details the background, findings, and conclusions of two studies completed in the Psychophysiology Laboratory of Baruch College, City University of New York, over the past twelve months. In Experiment I 36 individuals, 18 classified as Type A and 18 as Type B using the Jenkins Activity Survey, performed a perceptual motor task (simulated race car driving) along with a secondary task (simple reaction time) while a number of physiological measures were obtained. The measures were heart rate (HR), electromyogram (EMG) and skin temperature (ST). Analyses of performance results indicated that Type A individuals significantly slowed their reaction times (secondary task) when performing qualifying trials compared to practice trials. Experiment II tested a different sample of 36 subjects (18 each of Type A and B) in a design which compared the effects of participation in both a perceptual-motor and a cognitive (short term memory) task. The results showed that Type A subjects produced faster RT responses than Type Bs, but only while engaged in the cognitive task. The As also out performed the Bs in the cognitive task. In general, the cognitive task seemed to absorb more of the subjects' attention since RTs were significantly slower in the

AD-A170 070

AD-A170 070 CONTINUED

cognitive as compared to the perceptual-motor one. The Type As also had significantly higher skin conductance than Bs, although this was not differentiated according to task. An interesting finding here is that while SC is higher for As than Bs, skin temperature (ST) is also higher.

DESCRIPTORS: (U) PSYCHOPHYSIOLOGY, *PERFORMANCE(HUMAN), *RESPONSE(BIOLOGY), *PERCEPTION, *MOTOR REACTIONS, *MEMORY(PSYCHOLOGY), STRESS(PSYCHOLOGY), STRESS(PHYSIOLOGY), COGNITION, HEART RATE, ELECTROMYOGRAPHY, SKIN(ANATOMY), BODY TEMPERATURE, REACTION TIME, TEST METHODS, CORONARY DISEASE, EXPERIMENTAL DATA, STIMULATION(PHYSIOLOGY), ELECTROPHYSIOLOGY

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A4

AD-A170 070

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 069 3/1

GEORGIA S TE UNIV ATLANTA DEPT OF PHYSICS AND ASTRONOMY

(U) Astro sical Observations by Speckle Interferometry.

DESCRIPTIVE TE: Final rept. 1 Jun 81-28 Feb 88.

JUN 88 141P

PERSONAL A RS: McAlister,Harold A. .;

CONTRACT NO AFOSR-81-0181

PROJECT NO. 2311

TASK NO. A1

MONITOR: SR
TR 88-0475

UNCLASSIFIED REPORT

ABSTRACT: (U) Speckle interferometry is a method permitti the extraction of spatial information from two dimensio images at scales down to the diffraction limit of telescope in spite of severe blurring introduc by atmospheric turbulence. With existing large telesco speckle techniques thus permit resolution at spatial les of 0.025 arcseconds rather than the 1 to 2 arcseco associated with classical techniques. These methods also characterized by enhanced measurement accuracy the separation of closely spaced objects seen through turbulent atmosphere. The speckle interfer try system incorporates an intensified charge coupled ice array as the primary imaging detector and a hardw autocorrelator as a high speed data reduction process erating at video rates. The analysis of the reduced is carried out using a digital image processi system. The goals of these programs include: the det n of planetary mass objects in orbit about one com t of a widely separated binary star system through measurement of submotions in the otherwise ellipti otion of binary stars; the observation of asteroi with the goal of definitely answering the question the duplicity of these primordial members of the sola system; the resolution of suspected structure in the r ei of active galaxies and quasars; the reconstr tion of truly diffraction limited images of a variety astronomical objects; and, the generation of data applicable to a better understanding of the characteristics of atmospheric turbulence and its effects on high resolution imaging.

AD-A170 069 CONTINUED

DESCRIPTORS: (U) *ASTRONOMY, *OPTICAL INTERFEROMETERS, *INTERFEROMETRY, BINARY STARS, PLANETS, INTERSTELLAR SPACE, HIGH RESOLUTION, ASTEROIDS, DWARF STARS, IMAGE PROCESSING, DIFFRACTION ANALYSIS, CHARGE COUPLED DEVICES, DIGITAL SYSTEMS

IDENTIFIERS: (U) *Speckle interferometry, Digital images, PE61102F, WUAFOSR2311A1

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 0[illegible] 7/2

ILLINOI[illegible]IV AT URBANA DEPT OF ELECTRICAL AND COMPUTER ENGINEE[illegible]

(U) Resea[illegible]ch on a New Type of Negative Hydrogen Ion Source.

DESCRIPTIVE NOTE: Final rept. 15 Jul 81-14 Jan 85,

MAY 86 62P

PERSONAL A[illegible]THORS: Turnbull,R. J. ;

CONTRACT [illegible]. AFOSR-81-0160

PROJECT NO 2301

TASK NO. A7

MONITOR. AFOSR TR-86-0476

UNCLASSIFIED REPORT

ABSTRACT: (U) The production of negative hydrogen ions in a dis[illegible]rge is greatly enhanced if the hydrogen is vibrati[illegible]ally excited hydrogen. In the work presented here is a study of a method of producing vibrationally excited [illegible]ydrogen. The technique used is to heat dense hydrogen hot enough to produce vibrational excitation and then allow it to expand thus cooling it while maintaining the vib[illegible]tional excitation. Both theoretical calculations and exp[illegible]imental results on t[illegible]s technique are presented.

DESCRIPTORS: (U) *HYDROGEN, *ANIONS, ION SOURCES, PREPARA[illegible]N, EXCITATION, LASERS, HEATING, MOLECULAR VIBRATI[illegible] GASES, ELECTRIC ARCS, DISSOCIATION, VACUUM CHAMBERS, NOZZLE GAS FLOW, ELECTRONIC STATES, ENERGY LEVELS, FABRICATION

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A7

AD-A170 0[illegible]

AD-A170 065 8/16

BAYLOR COLL OF MEDICINE HOUSTON TX

(U) Amine Neurotransmitter Regulation of Long-Term Synaptic Plasticity in Hippocampus.

DESCRIPTIVE NOTE: Annual rept. 1 Apr 85-31 Mar 86,

APR 86 11P

PERSONAL AUTHORS: Johnston,Daniel ;

CONTRACT NO. AFOSR-85-0178

PROJECT NO. 2312

TASK NO. 46

MONITOR: AFOSR TR-86-0465

UNCLASSIFIED REPORT

ABSTRACT: (U) The overall goal of the research project is to investigate the mechanisms of long-term synaptic potentiation (LTP) in hippocampus, with particular emphasis on the modulation of LTP by amine neurotransmitters. During the first year of the grant, it was shown that LTP of the mossy fiber synapse in hippocampus is associated with an increase in the excitatory synaptic conductance with no change in reversal potential or membrane properties of the postsynaptic neuron. It was also shown that no long-term change in the inhibitory synaptic conductance was associated with LTP at the mossy fibers. In other work, various hypotheses associated with the previously observed modulation of LTP by norepinephrine (NE) were tested. It was found that cyclic AMP could mimic the action of NE and that NE could enhance LTP in the absence of synaptic inhibition. The cellular effects of NE were explored in an isolated hippocampal neuron system in which patch-clamp techniques were utilized. It was found that NE produced an enhancement in the voltage-dependent calcium current. Progress also was made towards the development of a computer model that simula[illegible] the behavior of single hippocampal neurons.

DESCRIPTORS: (U) *NEUROCHEMICAL TRANSMISSION, *SYNAPSE, *HIPPOCAMPUS, AMINES, ADRENAL MEDULLA HORMONES, PLASTIC

AD-A170 065

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 065 CONTINUED

PROPERTIES VE FIBERS, ADENOSINE PHOSPHATES, CYCLIC
COMPOUNDS E CELLS, CALCIUM, ELECTROPHYSIOLOGY,
COMPUTERIZ MULATION

IDENTIFIERS) Norepinephrine, AMP(Adenosine
Monophosp Cyclic AMP, LTP(Long Term Synaptic
Potentiati PE61102A, WUAFOSR231248

AD-A170 065

AD-A170 063 20/12

CALIFORNIA UNIV SANTA BARBARA DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Development of a Planar Heterojunction Bipolar Transistor for Very High Speed Logic.

DESCRIPTIVE NOTE: Annual technical rept. no. 3, 1 Oct 84-1 Mar 86.

MAR 86 55P

PERSONAL AUTHORS: Long,Stephen I. ;Kroemer,Herbert ;Rao,M. A. ;

CONTRACT NO. AFOSR-82-0344

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR
TR-88-0487

UNCLASSIFIED REPORT

ABSTRACT: (U) The following report describes the results of research on III-V molecular bm epitaxial (MBE) growth, material characterization and the fabrication of heterostructure bipolar transistors (HBT) for very high speed logic applications. During the reporting period work on the InGaP/GaAs heterojunction (HJ) was completed. Isotype HJs were grown and evaluated by a CV reconstruction me.hod in order to determine the energy band. offsets. It was found that Ec=0.21 eV and Ev=0.25 eV for the lattice matched composition. A new direction toward improvement in performance and the fabrication techniques for the AlGaAs/GaAs HBT was successfully demonstrated. Graded-bandgap nonalloyed ohmic contacts using n+ InAs and GaAs for the AlGaAs emitter and p+ GaSb for the GaAs base were provided by selective epitaxial regrowth. The MBE growth conditions for grading from GaAs to InAs to GaSb were determined. Low specific contact resistances were observed for both contact types. A AlGaAs/GaAs graded-gap contact HBT was grown. A current gain of 20 was measured with only simple wire probes on. the base and emitter.

DESCRIPTORS: (U) *BIPOLAR TRANSISTORS, *HETEROJUNCTIONS,

AD-A170 063

AD-A170 063 CONTINUED

*FABRICATION, EPITAXIAL GROWTH; MOLECULAR BEAMS, GALLIUM ARSENIDE, INDIUM PHOSPHIDES, ALUMINUM GALLIUM ARSENIDE, GALLIUM ANTIMONIDES

IDENTIFIERS: (U) Indium gallium phosphide, HBT(Heterostructure Bipolar Transistors), WUAFSR2305C1, PE61102F

AD-A170 059 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Almost Sure L(1)-Norm Convergence for Data-Based Histogram Density Estimates.

DESCRIPTIVE NOTE: Technical rept.,

MAR 88 17P

PERSONAL AUTHORS: Chen,X. R. ;Zhao,L. C. ;

REPORT NO. TR-88-07

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0394

UNCLASSIFIED REPORT

ABSTRACT: (U) The main result of this paper is summarized in Theorem 1, which states that when certain conditions of a general nature are satisfied, the data-based histogram density estimator is strongly consistent in the sense that the mean absolute deviation of the estimator and the density function converges to zero almost surely for any density function, as the sample size increases to infinity. (Author)

DESCRIPTORS: (U) *HISTOGRAMS, *ESTIMATES, DENSITY, *RANDOM VARIABLES*, *DISTRIBUTION FUNCTIONS*, *CONVERGENCE*, MULTIVARIATE ANALYSIS

IDENTIFIERS: (U) *Histograms density eslim, PE61102F, WUAFOSR2304A5

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 057 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Easily Stated but Hard Statistical Problems.

DESCRIPTIVE NOTE: Technical rept.,

MAY 86 20P

PERSONAL AUTHORS: Hollander,Myles ;

REPORT NO. FSU STATISTICS-M727, TR-86-188-AFOSR

CONTRACT NO. F49620-85-C-0007

PROJECT NO. 2304

MONITOR: AFOSR
TR-86-0442

UNCLASSIFIED REPORT

ABSTRACT: (U) This is an expository paper written in response to an invitation to give a non-technical talk in a session devoted to 'Practical Aspects of Statistics' at the 1986 Annual Statistical Meetings. The goal of the session is to encourage interest in statistics among non-statisticians. The author chose to describe three problems of current research interest. The problems have the feature that they can be stated in a relatively easy fashion. The solutions however are difficult. References to partial solutions are given; all three problems have aspects that remain unsolved and are currently under study. The problem of Section 2 deals with survivorship data and concerns estimation of average remaining life. Section 3 considers a problem that pertains to assessing the degree of similarity between species' presence or absence on islands. Section 4 presents a problem in geometrical probability. To conform to the spirit of the session, I have chosen to describe the problems in words, de-emphasizing symbols and mathematics and aiming for the non-statistician. (Author)

DESCRIPTORS: (U) *STATISTICS, ESTIMATES, PROBLEM SOLVING, LIFE EXPECTANCY(SERVICE LIFE), TABLES(DATA)

IDENTIFIERS: (U) PE61102F

AD-A170 057

AD-A170 058 12/1

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) On Mappings between Covariance Matrices and Physical Systems,

85 13P

PERSONAL AUTHORS: Kailath,T. ;Lev-Ari,H. ;

CONTRACT NO. DAAG29-83-K-0028, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0404

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Contemporary Mathematics, v47 p241-252 1985.

ABSTRACT: (U) In different contexts, several authors have established biunique mappings between positive definite Toeplitz kernels (or operators) and self adjoint second order differential equations describing physical systems such as vibrating strings and nonuniform transmission lines. To get in some sense a more complete picture of this mapping, it is necessary to extend it to mapping between families of non-Toeplitz operators and classes of physical systems. Each family contains a Toeplitz operator and all operators congruent to it in a certain sense; correspondingly, one adjoins different boundary conditions to the physical system associated with the Toeplitz operator. It is noted that the concept of displacement structure of operators is naturally associated with the above results. Also that the generalized mapping leads to new classification of positive definite operators into 3 distinct classes, to generalizations of orthogonal polynomials and to new Christoffel Darboux formulas for fast algorithms for operator factorization, and to efficient new implementations for prediction and estimation filters.

DESCRIPTORS: (U) *MAPPING(TRANSFORMATIONS), MATRICES(MATHEMATICS), TRANSMISSION LINES, VIBRATION, LINEAR SYSTEMS, LEAST SQUARES METHOD, CONVOLUTION

AD-A170 058

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 05[illegible] CONTINUED

INTEGRA[illegible]ERNEL FUNCTI[illegible]NS, ALGORITHMS,
OPERATO[illegible]THEMATICS), ORTHOGONALITY, REPRINTS

IDENTIFIE[illegible] (U) Toeplitz matrices, Christoffel Darboux
formula[illegible]AFOSR2304A5, PE61102F

AD-A170 052 8/7 12/1

MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR COMPUTER SCIENCE

(U) Layer by Layer Reconstruction Methods for the Earth Resistivity from Direct Current Measurements.

NOV 85 11P

PERSONAL AUTHORS: Levy,Bernard C. ;

CONTRACT NO. AFOSR-82-0135

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-86-0449

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Geoscience and Remote Sensing, vGE-23 n6 p841-850 Nov 85.

ABSTRACT: (U) Several methods for reconstructing the resistivity profile of a layered laterally homogeneous earth from direct current measurements are described. These methods recover the resistivity of the earth layer by layer in a recursive way, and require a very small amount of computational effort. They are obtained by transforming the inverse resistivity problem into an equivalent inverse scattering problem, and by applying efficient signal processing algorithms such as the Schur, fast Cholesky or Levinson recursions to the transformed problem. These algorithms operate on a layer stripping or layer accumulation principle, and are shown to be related to previous reconstruction techniques of Pekeris, Koefoed, Kunetz and Rocroi, and others.

DESCRIPTORS: (U) *EARTH MODELS, *ELECTRICAL RESISTANCE, INVERSION, HOMOGENEITY, LAYERS, DIRECT CURRENT, DEPTH, TRANSFORMATIONS(MATHEMATICS), RECURSIVE FUNCTIONS, SIGNAL PROCESSING, ALGORITHMS, REPRINTS

IDENTIFIERS: (U) Earth resistivity, Inverse scattering, Resistivity prospecting, Layered earth models, Reconstruction methods, PE61102F, WUAFOSR2304A1

AD-A170 056

AD-A170 052

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 043 20/8 20/7 20/3

TENNESSEE U[illegible] V KNOXVILLE PLASMA SCIENCE LAB

(U) Investi[illegible]tion of RF Emissions from Two Beams Interact[illegible]g with an Electric Field Dominated Plasma.

DESCRIPTIVE N[illegible]TE: Final rept. 15 Mar 81-14 Mar 88,

MAY 88 180P

PERSONAL AUTH[illegible]S: Roth,J. R. ;

REPORT NO. [illegible] PSL-88-1

CONTRACT NO. AFOSR-81-0093

PROJECT NO. 2301

TASK NO. A3

MONITOR: AF[illegible]R
TR[illegible]-0474

UNCLASSIFIED REPORT

ABSTRACT: (U) This final scientific report summarizes a five year p[illegible]ram of experimental research on a steady state, ele[illegible]ic field dominated, classical Penning discharge a[illegible] the University of Tennessee's Plasma Science Laboratory [illegible]e objectives of this research program were to study RF [illegible]issions and RF interactions with a steady-state, ele[illegible]ic field dominated plasma which exhibited instabilit[illegible] associated with two interpenetrating electron b[illegible]. Among the scientific results of this contract a[illegible] the observation and identification of the geometric [illegible]s emission frequency. The RF emissions associated [illegible]th the geometric mean emission freuency and its harmoni[illegible]s could produce, under some conditions, a virtually f[illegible]t white noise spectrum from below 0.5 megahertz t[illegible] frequencies above 1.2 GHz. Quantitative investigati[illegible]s during the latter part of this contract showed that [illegible]e efficiency of converting the dc electrical [illegible]er input of the classical Penning discharge into broad[illegible]d RF radiation was no more than 0.1 or 1.0%.

DESCRIPTORS: (U) *PLASMA OSCILLATIONS, *ELECTRON BEAMS, *MAGNETIC F[illegible]DS, *ELECTRIC FIELDS, EMISSIVITY, COUPLING([illegible]ACTION), RADIOFREQUENCY, TURBULENCE, KINETIC EN[illegible]f, TRANSPORT PROPERTIES, THESES

AD-A170 043

AD-A170 043 CONTINUED

IDENTIFIERS: (U) Diagnostics(Plasma), Magnetic pumping, Penning discharges, Steady state plasmas, Ion temperatures, Dual beam instabilities, Confinement(Plasma), Heating(Plasma), PE61102F, WUAFOSR2301A8

OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 033 12/1

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF APPLIED MATHEMATICS AND STATISTICS

(U) A Note on Bayes Empirical Bayes Estimation by Means of Dirichlet Processes.

DESCRIPTIVE NOTE: Research rept. Jul 84-Sep 85.

SEP 85 21P

PERSONAL AUTHORS: Kuo,Lynn ;

REPORT NO AMS-85-80

CONTRACT NO. AFOSR-84-0138

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0425

UNCLASSIFIED REPORT

ABSTRACT: (U) Bayes estimators are derived by means of the Dirichlet process hyperprior approach for general empirical Bayes problems. For any sample size, these estimators are expressed concisely as ratios of two multidimensional integrals. A numerical example on Poisson sampling is given. Keywords: Bayesian nonparametric density method; compound Poisson distribution. (Author)

DESCRIPTORS: (U) *ESTIMATES, *DIRICHLET INTEGRAL, POISSON, DENSITY FUNCTIONS, STATISTICAL SAMPLES, BAYES THEOREM, NONPARAMETRIC STATISTICS, RANDOM VARIABLES STATISTICAL INFERENCE, MONTE CARLO METHOD

IDENTIFIERS: (U) *Bayes estimators, PE61102F

AD-A170 035 20/3

TEXAS A AND M UNIV COLLEGE STATION DEPT OF ELECTRICAL ENGINEERING

(U) A Novel Differential Geometric Approach toward Robust Signal Detection.

DESCRIPTIVE NOTE: Rept. for 23 May 85-22 May 86.

MAY 86 7P

PERSONAL AUTHORS: Thompson,M. W. ;Halverson,D. R. ;

CONTRACT NO. AFOSR-82-0033

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0432

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at Conference on Information and System Sciences, 19-21 Mar 86.

ABSTRACT: (U) We present a new approach toward robust signal detection which is based on techniques rooted in differential geometry. These methods, as opposed to the commonly employed classical saddlepoint criteria, readily admit the quantitive measure of the degree of robustness over very general classes of admissible noise distributions. Our approach thus is seen to make possible investigations of the quantative tradeoff between optimal performance and robustness, and we illustrate the application of this differential geometric approach via various specific examples. (Author)

DESCRIPTORS: (U) *SIGNAL PROCESSING, SIGNALS, DETECTION, NOISE, REPRINTS

IDENTIFIERS: (U) *Robust* signal detection, Robustness, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 (4 6/5 6/1 6/3

OHIO S TE UNIV RESEARCH FOUNDATION COLUMBUS

(U) Im s Dysfunctions and Abrogation of the Inflammatory Re. e L/ Environmental Chemicals

DESCRIPT E NOTE: Final rept. 1 Jul 83-31 Dec 85,

FEB 8 31P

PERSONAL THORS: Olsen,Richard G.

CONTRACT F49620-83-C-0114

PROJECT 2312

TASK NO A5

MONITOR AFOSR TR-86-0488

UNCLASSIFIED REPORT

ABSTRACT (U) During this reporting period, further exam of 1,1-dimethylhydrazine (UDMH) induced immun ancment have been noted, and at least two possi echanisms for immunoenhancement have been sugge First, in vivo or in vitro exposure to UDMH result in enhancement of the allogeneic mixed lymphocyte respo a measure of cell mediated immunity Inter ce of certain macrophage functions by UDMH has been strated, such as decreased prostaglandin E2 produc and chemiluminescence. Inhibition of these prope s which are associated with macrophage related immun ression could explain the immunoenhancement induc y UDMH. Preliminary experiments also suggest that enchances interleukin 1 production by macro s and interleukin 2 activity on cell proli tion, but that it inhibits interleukin 1 activi

DESCRIP (U) *DIMETHYLHYDRAZINES, *IMMUNITY, *INFL TION, EXPOSURE(PHYSIOLOGY), IMMUNOLOGY, LYMPH S, PHAGOCYTES, PROSTAGLANDIN, CHEMILUMINESCENCE, IN VI ALYSIS, IN VITRO ANALYSIS, IMMUNOSUPPRESSION

IDENTIFI (U) Interleukin 1, Interleukin 2, PE61102F, LPN O 763814/715387

AD-A170 4

AD-A170 032 9/2

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF COMPUTER SCIENCE

(U) Metaprogramming: A New Methodology for the Construction of Quality Software.

DESCRIPTIVE NOTE: Final rept. 15 Jun 81-14 Sep 84,

JAN 86 13P

PERSONAL AUTHORS: Flon,Lawrence ;Cooprider,Lee ;Horowitz, Ellis ;Curran,Anne M. ;Paradan,Thierry ;

REPORT NO. 53-4510-1741

CONTRACT NO. AFOSR-81-0199

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR TR-88-0419

UNCLASSIFIED REPORT

ABSTRACT: (U) There were three major contributions that came out of this research. The first was the development of a program development environment that permits software to be reused. The second was the development of techniques for the design and specification of concurrent programs. The third was a new method for writing programs that involves pictures. For each of these conditions a student Ph.D. thesis was produced, in particular Dr. Anne Curran worked on the first problem, Dr. Thierry Paradan worked on the second problem and Dr. Georg Raeder worked on the last problem. Since each of their contributions are radically different, this summary report is broken into three categories, each based upon their work.

DESCRIPTORS: (U) *COMPUTER PROGRAMMING, *COMPUTER PROGRAMS, REUSABLE EQUIPMENT, QUALITY CONTROL, SPECIFICATIONS, COMPUTER PROGRAM RELIABILITY, COMPUTER GRAPHICS, METHODOLOGY, SYSTEMS ENGINEERING, MODULAR CONSTRUCTION, HIGH LEVEL LANGUAGES, COMPUTER PROGRAM VERIFICATION, USER NEEDS, THESES

IDENTIFIERS: (U) Metaprogramming, ADA programming

AD-A170 032

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 ( ) CONTINUED

langua PE61102F

AD-A170 030 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Detection of Outliers in Multivariate Linear Regression Model.

DESCRIPTIVE NOTE: Technical rept.,

APR 86 10P

PERSONAL AUTHORS: Naik,Dayanand N. ;

REPORT NO. TR-86-11

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0359

UNCLASSIFIED REPORT

ABSTRACT: (U) This article suggests multivariate kurtosis measure as a statistic for detection of outliers in a multivariate linear regression model. The statistics has some local optimal properties. Keywords: Multivariate linear regression model; Detection of outliers; Multivariate kurtosis; and Locally best invariant test.

DESCRIPTORS: (U) *LINEAR REGRESSION ANALYSIS, *MULTIVARIATE ANALYSIS, *RANGE(EXTREMES), DETECTION, INVARIANCE, MATHEMATICAL MODELS, VECTOR ANALYSIS

IDENTIFIERS: (U) *Outliers, Kurtosis, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 029 20/9

STANFORD UN... CA HIGH TEMPERATURE GASDYNAMICS LAB

(U) Fundame... Processes in Partially Ionized Plasmas.

DESCRIPTIVE N... : Annual scientific rept. 1 Feb 85-31 Jan 86.

FE. 88 82P

PERSONAL AUT... : Kruger,C. H. ;Mitchner,M. ;Self,S. A. ;

CONTRACT NO. : AFOSR-83 0108

PROJECT NO. ... 01

TASK NO.

MONITOR: A...
T... 0342

UNCLASSIFIED REPORT

ABSTRACT: ... This research is directed to three major areas: rec... ation in molecular plasmas, discharge effects (p... electrode interaction) and interaction of discharges ... fluid dynamics. Recombination and ionization ... fundamental processes that play a role in nearly all ... ications and natural phenomena that involve pa... ly ionized plasmas. Under the present program, e... ments have been designed and theoretical analyses ... ted to obtain a better knowledge of the rates of e... on recombination in the presence of molecular ... es. Studies are continuing of the near-electrode ... n and the processes by which current is transferre... ween the plasmas and the electrodes. The first sta... theoretical modeling of these processes has now b... pleted and published. A study of the interactio... discharges and fluid dynamics has measured the signif... t secondary flows caused by the interaction of a magne... field with a current carrying plasma. Measureme... ve been made of secondary flows, and of their effe... on profiles of axial velocity, turbulence intensity ... electrical conductivity.

DESCRIPTORS: ... *PLASMAS(PHYSICS), *RECOMBINATION REACTIONS ... ONDARY FLOW, *ELECTRIC DISCHARGES, *ELECTROD... S, AXES, ELECTRICAL CONDUCTIVITY, ELECTRODES ... ECTRONS, FLUID DYNAMICS, INTENSITY,

AD-A170 029

AD-A170 029 CONTINUED

INTERACTIONS, IONIZATION, MAGNETIC FIELDS, MOLECULES, THEORY, TURBULENCE, VELOCITY, PLASMA SHEATHS, MAGNETOHYDRODYNAMICS, ANODES, CATHODES, BREAKDOWN(ELECTRONIC THRESHOLD)

IDENTIFIERS: (U) PE61102F

AD-A170 029

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 025 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) On Estimation of Dimensionality under Multivariate Regression and Canonical Correlation Models

DESCRIPTIVE NOTE: Technical rept.,

APR 86 53P

PERSONAL AUTHORS: Krishnaiah,P. R. ;

REPORT NO TR-86-10

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR 86-0343

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper, the author gives a review of the literature on various techniques for determination of the ranks of regression matrix and canonical correlation matrix. Also, methods of selection of important original variables under multivariate regression and canonical correlation models are reviewed. The methods reviewed involve not only tests of hypotheses but also model selection methods based upon information theoretic criteria. Keywords: Contingency tables; correlation; multivariate regression equations model; discriminant analysis; econometrics; likelihood ratio test; linear and structural relations; pattern recognition; Random effects model. (Author)

DESCRIPTORS: (U) *REGRESSION ANALYSIS, *MULTIVARIATE ANALYSIS, CORRELATION, MATRICES(MATHEMATICS), MATHEMATICAL MODELS, PATTERN RECOGNITION, ECONOMETRICS

IDENTIFIERS (U) PE61102F

AD-A170 024 8/1 8/3

ROCKEFELLER UNIV NEW YORK

(U) Role of Protein Phosphorylation in Regulation of Bioreactivity.

DESCRIPTIVE NOTE: Annual technical rept. 1 Mar 85-28 Feb 86,

MAR 86 10P

PERSONAL AUTHORS: Greengard,P. ;

CONTRACT NO. AFOSR-84-0086

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR TR-86-0467

UNCLASSIFIED REPORT

ABSTRACT: (U) Four neuron-specific phosphoproteins ad calcium/calmodulin-dependent protein kinase II were used as model proteins to investigate the role of protein phosphorylationin the regulation of bioreactivity in the nerfous system. These studies were carried out at the levels of electrophysiology, biochemistry, and molecular biology, in an attempt to obtain the dependent proetin kinase II were pressure-injecdted into the preterminal digit of the squid giant synapse to test directly the possible regulation of neurotrnsmitter release by these substances. The binding of Synapsin I to small synaptic vesicles was examined. The mechanism of calcium/ calmodulin-dependent protein kinase II autophosphorylation and its effect on the activity of the enzyme were studied. The regional and subcellular distributions of proteins IIIa and IIIb in the nervous system were determined. The regional and subcellular distributions of protein p38 in the nervous system were determined. A partial cDNA clone for Synapsin I was obtained.

DESCRIPTORS: (U) *PROTEINS, *PHOSPHORYLATION, *NEUROCHEMISTRY, NEUROCHEMISTRY, SYNAPSE, CALCIUM, PHOSPHORUS TRANSFERASES, NERVE CELLS, RIBONUCLEIC ACIDS, PROTEIN METABOLISM, SUBSTRATES, BIOCHEMISTRY, CLONES.

AD-A170 024

AD-A170 024 (CONTINUED)

NUCLEOTIDES, ...TIDES, MOLECULAR BIOLOGY, DEOXYRIBONUC... ACIDS, CEPHALOPODA

IDENTIFIERS: (U) Phosphoproteins, WUAFOSR2312A2, PE81102F

AD-A170 021 5/3 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) On the Pricing of American Options.

DESCRIPTIVE NOTE: Technical rept. Sep 85-Aug 86,

MAY 86 28P

PERSONAL AUTHORS: Karatzas, Ioannis ;

REPORT NO. TR-137

CONTRACT NO. F49620-85-C-0144, NSF-DMS84-16736

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0443

UNCLASSIFIED REPORT

ABSTRACT: (U) In an important and relatively recent article Bensoussan presents a rigorous treatment of the pricing problem for contingent claims that can be exercised at any time before maturity. He adapts to this situation the Black & Scholes methodology of duplicating the cash flow from such a claim by managing skillfully a self-financing portfolio that contains only the basic instruments of the market, i.e., the stocks and the bond, and that entails no arbitrage opportunities before exercise. Under a condition on the market model called completeness Bensoussan shows that the valuation of such claims is indeed possible and characterizes the exercise time in terms of an appropriate optimal stopping problem. In the study of the latter, Bensoussan employs the so-called 'penalization method,' which forces rather stringent boundedness and regularity conditions on the payoff from the contingent claim. Such conditions are not satisfied, however, by the prototypical examples of such claims, i.e., American call options. The aim of this paper is to offer an alternative methodology on this problem, which is actually simpler and manages to remove the above restrictions.

DESCRIPTORS: (U) *MATHEMATICAL MODELS, *INVESTMENTS,

AD-A170 021 CONTINUED

STOPPING ES(MATHEMATICS), MATRICES(MATHEMATICS), BROWNIAN ION, FINANCIAL MANAGEMENT, VALUE

IDENTIFIERS (U) Sensoussan model, PE61102F, WUAFOSR2 K5

AD-A170 020 6/3 6/1

AT AND T BELL LABS INC MURRAY HILL NJ

(U) An Investigation into the Effects of Peptide Neurotransmitters and Intracellular Second Messengers in Rat Central Neurons in Culture.

DESCRIPTIVE NOTE: Annual rept. 15 Oct 84-15 Oct 85,

MAY 86 82P

PERSONAL AUTHORS: Connor,John A. ;

CONTRACT NO. F49620-85-C-0009

PROJECT NO. 2312

TASK NO. K2

MONITOR: AFOSR TR-86-0466

UNCLASSIFIED REPORT

ABSTRACT: (U) Significant progress has been made in several areas of our research proposal. We have developed a Ca-imaging system which is now capable of resolving subcellular Ca changes on the order of seconds. This Ca-imaging system has been used to study neurotransmitter actions in culture diencephalic and cerebellar neurons. Both classical (GABA) and modulatory (thyroid hormone) neurotransmitters were found to affect cellular Ca(2+) levels in these cells without depolarizing resting potential. We have also continued studies of second messenger action in identifiable molluscan neurons. The concentration of endogenous cyclic AMP in single cells was measured, and under stimulated conditions the levels were sufficient to suggest activation of cyclic AMP-induced membrane conductances.

DESCRIPTORS: (U) *NEUROCHEMICAL TRANSMISSION, *CALCIUM, *PEPTIDES, *NERVE CELLS, MEMBRANES(BIOLOGY), BRAIN, SYNAPSE, CEREBELLUM, ADENOSINE PHOSPHATES, AMINO ACIDS, BUTYRIC ACIDS, THYROID HORMONES, CATIONS, MOLLUSCA, ACTIVATION, HISTAMINE, CYTOCHEMISTRY, NERVE BLOCKING, RATS

IDENTIFIERS: (U) AMP(Adenosine Monophosphate), GABA(Gamma Aminobutyric Acid), PE61102F, WUAFOSR2312K2

AD-A170 021

AD-A170 020

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 014 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Extreme Point Methods in the Study of Classes of Bivariate Distributions and some Applications to Contingency Tables.

DESCRIPTIVE NOTE: Technical rept.,

APR 88 68P

PERSONAL AUTHORS: Subramanyam,K. ;Rao,M. B. ;

REPORT NO. TR-88-12

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0358

UNCLASSIFIED REPORT

ABSTRACT: (U) The set of all bivariate positive distributions is neither compact nor convex But the set of all bivariate positive quadrant distributions with fixed marginals is a convex set. These convex sets are compact in the case of discrete bivariate distributions if the marginals have finite support. A simple method to enumerate the extreme points of these convex sets is given. In the context of contingency tables for testing the null hypothesis independence against the alternative positive quadrant dependence one can use the method of extreme point analysis to compare the performance of various tests. Keywords: Extreme point; Convex set; Compact set; Bivariate distributions; Positive quadrant dependence; Negative quadrant dependence; and Power function of contingency tables.

DESCRIPTORS: (U) *BIVARIATE ANALYSIS, *DISCRETE DISTRIBUTIONS, CONVEX SETS, QUADRANTS, DISTRIBUTION

IDENTIFIERS: (U) Contingency tables, WUAFOSR2304A5, PE61102F

AD-A170 004 9/2

MIAMI UNIV CORAL GABLES FLA PLASMA PHYSICS LAB

(U) Analysis of Fault Tolerant Computer Systems.

DESCRIPTIVE NOTE: Technical rept.,

FEB 85 42P

PERSONAL AUTHORS: Sumita,Ushio ;Shanthikumar,J. G. ; Masuda,Yasushi ;

CONTRACT NO. AFOSR-84-0205, NSF-ECS84-04071

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0403

UNCLASSIFIED REPORT

ABSTRACT: (U) In many critical applications of digital systems, fault tolerance has been an essential architectural attribute for achieving high reliability. In recent years, the concept of the performability of such systems has drawn the attention of many researchers. In this paper, we develop a general Markov model for fault tolerant computer systems. Various important performance measures, including the performability measures as well as some new performance measures, are treated in a unified manner. Furthermore general and efficient computational procedures are developed for calculating these performance measures based on the uniformization technique of Keilson (1974, 1979). A numerical example is given to illustrate the computational procedures developed. (Author)

DESCRIPTORS: (U) *FAULT TOLERANT COMPUTING, *SYSTEMS ANALYSIS, DIGITAL COMPUTERS, MATHEMATICAL MODELS, MARKOV PROCESSES, AVAILABILITY, RELIABILITY, COMPUTATIONS

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 002 8/16 8/19

BETH ISRAEL HOSPITAL BOSTON MASS

(U) Fracture and Viscoelastic Characteristics of the Human Cervical Spine.

8 221P

PERSONAL AUTHORS: Edwards,W. T. ;Hayes,W. C. ;Kou,Y. F. ; Coffee M S. ;White,A. A. , III ;

CONTRACT NO. F49620-81-K-0010

PROJECT NO. 2312

TASK NO. A2

MONITOR: AFOSR TR-88-0453

UNCLASSIFIED *REPORT*

ABSTRACT (U) Cervical spine segments were tested both nondestructively and destructively to determine the load-displacement relationships and vertebral strength. For this study, a servo-hydraulic multi-degree of freedom materials testing machine was designed and constructed. This new system, called the Planar Testing Apparatus (PTA), was used to generate motions needed to characterize the sagittal response of spine segments. A study of the viscoelastic properties of two vertebrae lumbar spine segments was conducted following the completion of the PTA to check and demonstrate the test system. The results from seven lumbar specimens were also included in this report. The cervical spine segments consisted of three vertebrae and their interconnecting soft tissue, discs, and ligaments. A noninvasive electro-mechanical displacement measuring apparatus was constructed to monitor the six degree of freedom motion of the middle vertebral body as it moved relative to the two adjacent vertebrae during the mechanical tests. Results for cervical spine specimens indicated that a low displacement rates (less than 5 mm/sec or 5 deg/sec) there was no dependence of spinal segment stiffness on displacement rate. Curves for load vs. displacement (both axial and shear) and moment vs. sagittal bending displayed large regions of small load and low slope as displacements increased. All specimens were stiffer in compression that in tension. All specimens displayed soft tissue failure before bony fracture for loading in flexion.

DESCRIPTORS: (U) *SPINAL COLUMN, *BONE FRACTURES, *VISCOELASTICITY, BIODYNAMICS, MOTION, SEGMENTED, NONDESTRUCTIVE TESTING, DESTRUCTIVE TESTS, LOAD DISTRIBUTION, DISPLACEMENT, STRENGTH(MECHANICS), TEST METHODS, FAILURE, CREEP, STIFFNESS, BENDING, TRANSDUCERS

IDENTIFIERS: (U) Vertebrae, WUAFOSR2312A2, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A170 001 11/2 20/11

SOUTHWEST R[illegible]SCH INST SAN ANTONIO TEX DEPT OF MATERIALS S[illegible]ES

(U) Study of [illegible]gh Temperature Failure Mechanisms in Ceramics.

DESCRIPTIVE NOTE: Annual rept. 1 Apr 85-31 Mar 86,

APR 86 25P

PERSONAL AUTHOR(S): Page,Richard A. ;Lankford,James ;

REPORT NO. S[illegible]I-8578/2

CONTRACT NO. F[illegible]820-85-C-0073

PROJECT NO. [illegible]8

TASK NO. A2

MONITOR: AF[illegible]R
TR[illegible]-0485

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the results of a fundamental study involving experimental characterization and analytical modeling of grain boundary cavitation and creep crack growth in structural ceramics exposed to pure tensile loading. The major experimental techniques employed in this program are the use of small-angle neutron scattering to characterize cavity nucleation and growth and stereoimaging analysis to characterize the stress and strain fields associated with growing creep cracks. In the first section of the report, the experimental progress is summarized. The design of the pure tensile creep apparatus, which is being used for the creation of bulk damage and for creep crack growth, is discussed. The progress made in the determination of surface preparation conditions that are adequate for the stereoimaging analysis is also discussed. The second section of the report describes the results of a critical review of recent experimental and theoretical studies of creep cavitation in ceramics. The results of this critical study have identified a number of stochastic aspects of cavitation. The stochastic nature of cavitation arises primarily due to the dependence of both cavity nucleation and cavity growth on grain boundary sliding. A degree of randomness is also imposed by the nonuniform distribution of nucleation sites. These results suggest that the measurement of grain boundary sliding rates and the development of a statistical model of cavitation will be crucial to the understanding and modeling of tensile creep failure.

DESCRIPTORS: (U) *CERAMIC MATERIALS, *FAILURE(MECHANICS), GRAIN BOUNDARIES, CAVITATION, CREEP, CRACK PROPAGATION, TENSILE STRESS, LOADS(FORCES), NUCLEATION, STRAIN(MECHANICS), DAMAGE ASSESSMENT, NEUTRON SCATTERING, STEREOPHOTOGRAPHY, STOCHASTIC PROCESSES, SLIDING, MATHEMATICAL MODELS, HIGH TEMPERATURE

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A2

OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 9[illegible] 9/2 ·

TEXAS U[illegible]Y AT AUSTIN DEPT OF COMPUTER SCIENCES

(U) TRAC [illegible]exas Reconfigurable Array Computer): An Envi[illegible]ment for Parallel Computing.

DESCRIPTIV[illegible] NOTE: Final rept. 1 Feb 84-31 Jan 85.

84 6P

PERSONAL AUTHORS: Browne,J. C. ;

CONTRACT [illegible] F496[illegible]4-C-0020

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR 86-0460

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE, p292-298 1984.

ABSTRACT: (U) This paper defines one set of requirements for a s[illegible]essful general purpose parallel architecture, describ[illegible] the design concepts of the Texas Reconfigurable Array C[illegible]puter (TRAC) and then demonstrates that the TRAC archite[illegible]re fulfills these requirements. It will be seen that TR[illegible] implements a general purpose parallel computa[illegible]n system through its ability to implement a spectru[illegible] of single purpose architectures. Special attenti[illegible] is paid to architectural support for software and to t[illegible]e I/O problems for a many-processor architecture. (Author)

DESCRIPTO[illegible] (U) *COMPUTER ARCHITECTURE, *PARALLEL PROCESS[illegible] COMPUTATIONS, REQUIREMENTS, INPUT OUTPUT PROCESS[illegible], REPRINTS

IDENTIFIE[illegible] (U) TRAC(Texas Reconfigurable Array Computer), PE61102F, WUAFOSR2304A3

AD-A169 997 20/4

STANFORD UNIV CA DEPT OF MATHEMATICS

(U) Classroom Notes in Applied Mathematics.

84 9P

PERSONAL AUTHORS: Verman,Ghasi R. ;Keller,Joseph B. ;

CONTRACT NO. AFOSR-85-0007

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR
TR-86-0470

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Seminar on Nonlinear Partial Differential Equations, p99-113 1984.

ABSTRACT: (U) Free boundary problems are defined and illustrated by several problems in mechanics. First the problem of finding the free surface of a liquid in hydrostatic equilibrium is considered. Then the effect of surface tension is taken into account. Finally the contact of an inflated membrane, such as a balloon or tire, with a solid surface is formulated. This problem is solved by the method of matched asymptotic expansions when the contact area is small. (Author)

DESCRIPTORS: (U) *BOUNDARY VALUE PROBLEMS, *APPLIED MATHEMATICS, LIQUIDS, HYDROSTATICS, EQUILIBRIUM(GENERAL), INTERFACIAL TENSION, REPRINTS

IDENTIFIERS: (U) Free surface, PE61102F, WUAFOSR2304A4

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 996 12/1

RENSSELAER POLYTECHNIC INST TROY NY DEPT OF MATHEMATICAL SCIENCES

(U) Scanning Control of a Vibrating String.

86 22P

PERSONAL AUTHORS: McLaughlin,J. R. ;Slemrod,M. ;

CONTRACT NO. N00014-84-K-0516, AFOSR-81-0172

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-86-0387

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Mathematics and Optimization, v14 p27-47 1986.

ABSTRACT: (U) The purpose of this paper is to construct a stabilizing feedback control law for a vibrating string equation. The rest of this paper is divided into four sections. Section 1 reviews the necessary results needed on nonlinear semigroups and Section 2 provides the basic theory of asymptotic decay. Section 3 applies this theory to (F). Finally in Section 4 it is shown that the results are sharp by giving an example in which (F) fails to yield asymptotic decay of (y, y sub t) for a smooth phi with compact support.

DESCRIPTORS: (U) *FEEDBACK, *CONTROL SYSTEMS, BOUNDARY VALUE PROBLEMS, NONLINEAR ALGEBRAIC EQUATIONS, POLYNOMIALS, *REPRINTS

IDENTIFIERS: (U) *Vibrating string equation, PE61102F, WUAFOSR2304A1

AD-A168 995 12/1

CALIFORNIA UNIV SANTA BARBARA ALGEBRA INST

(U) Mixed Multiplicativity and l sub p Norms for Matrices.

JAN 86 11P

PERSONAL AUTHORS: Goldberg,Moshe ;

CONTRACT NO. AFOSR-83-0150

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-86-0472

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Linear Algebra and Its Applications, v71 p123-131 Jan 85.

ABSTRACT: (U) Let C sub m x n denote the class of m x n complex matrices; and let N sub 1, N sub 2, and N sub 3 be arbitrary norms on C sub m x n, C sub m x k, and C sub k x n, respectively. In this paper we discuss a best (least) positive constant micro sub min.

DESCRIPTORS: (U) *MATRICES(MATHEMATICS), CONSTANTS, LINEAR ALGEBRA, REPRINTS

IDENTIFIERS: (U) Multiplicativity, PE61102F, WUAFOSR2304A3

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 992 9/1

BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

(U) Picosecond Nonlinear Resonant Interactions in Semiconductors.

DESCRIPTIVE NOTE: Final rept. 1 Jan 82-30 Sep 85.

MAR 86 60P

PERSONAL AUTHORS: Nurmikko,Arto V. ;

CONTRACT NO. F49620-82-C-0044

PROJECT NO. 2306

TASK NO. B2

MONITOR: AFOSR TR-86-0718

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was aimed at advancing understanding and utilization of selected optical properties of semiconductors containing magnetic elements. Emphasis was placed on the interaction of such materials with ultrashort pulses of laser radiation in order to study coupled electronic and magnetic excitations under selected nonequilibrium conditions. We hoped to generate novel results through experimental research for applications to fast optoelectronic devices. The mixed crystal semiconductors (Cd, Mn)Se and (Cd, Mn)Te were used. The contract work has generated a number of 'firsts', e.g. we measured the formation of local, microscopic magnetically oriented 'domains' through real-time spectroscopy with picosecond laser pulses. (Author)

DESCRIPTORS: (U) *SEMICONDUCTORS, *OPTICAL PROPERTIES, MAGNETIC MATERIALS, SPECTROSCOPY, EXCITATION, EUROPIUM, CADMIUM, MANGANESE, SELENIUM, TELLURIUM

IDENTIFIERS: (U) *Mixed crystal semiconductors, PE61102F, WUAFOSR2306B2

AD-A169 991 9/2

TEXAS UNIV AT AUSTIN DEPT OF COMPUTER SCIENCES

(U) Framework for Formulation and Analysis of Parallel Computation Structures.

DESCRIPTIVE NOTE: Final rept. 1 Feb 84-31 Jan 85.

85 7P

PERSONAL AUTHORS: Browne,J. C. ;

CONTRACT NO. F49620-84-C-0020, NSF-MCS81-16099

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR TR-86-0459

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the Annual Hawaii International Conference on System Sciences (18th), p2-7 1985.

ABSTRACT: (U) This paper gives a systematic methodology for the formulation of parallel computation structures and algorithms. The methodology supports both synthesis of parallel algorithms and analysis of parallel algorithms. (Author)

DESCRIPTORS: (U) *COMPUTER ARCHITECTURE, PARALLEL PROCESSING, ALGORITHMS, COMPUTATIONS, REPRINTS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A3

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 990 9/2

NORTH CARO[illegible]A UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) A Bilat[illegible]ily Deterministic RHO-Mixing Stationary Random [illegible]uence.

MAR 86 10P

PERSONAL AU[illegible]S: Bradley,Richard C. ;

CONTRACT NO. F49620-85-C-0144, NSF-DMS84-01021

PROJECT NO. [illegible]304

TASK NO. A5

MONITOR: AF[illegible]R
TR-86-0361

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Transactions of the American Mathematical Society, v294 n1 p233-241 Mar 86.

ABSTRACT: (U) A (nondegenerate) strictly stationary sequence (X sub k, k epsilon Z) of random variables is constructed such that the rho-mixing (maximal correlation mixing) condition is satisfied and each X sub k is measurable with respect to the double tail delta-field. (Author)

DESCRIPTORS: (U) *SEQUENTIAL ANALYSIS, *RANDOM VARIABLES, CORRELATION, STATIONARY, REPRINTS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

AD-A169 990

AD-A169 989 12/1

NORTH CAROLINA STATE UNIV AT RALEIGH DEPT OF MATHEMATICS

(U) Difference Methods for the Numerical Solution of Time-Varying Singular Systems of Differential Equations.

APR 86 13P

PERSONAL AUTHORS: Clark,Kenneth D. ;

CONTRACT NO. AFOSR-84-0240, NSF-DMS83-18026

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0445

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SIAM Jnl. on Algebraic and Discrete Methods, v7 n2 p236-248 Apr 86.

ABSTRACT: (U) This reprint introduces a class of difference methods for the numerical solution of differential equations of the form A(t)x'+B(t)x(t)=f(t) where A, B, and f are assumed sufficiently smooth in t in the interval I = (0,T) and A(t) is identically singular on I. These methods are straightforward extensions of the well-known Gear's backward difference methods (BDF's) and correspond to BDF's whenever A is constant. It is shown that the modified methods (MBDF's) work whenever the system can be transformed to a constant coefficient problem by a change of variable x = Ly, and also whenever a related system can be transformed into a certain canonical form. The author also investigates the relationship between the convergence of BDF's and the continuous regularization of the system by its pencil perturbation. In particular, he shows the existence of examples where the BDF's converge but the pencil perturbation is not a continuous regularization. (Author)

DESCRIPTORS: (U) DIFFERENTIAL EQUATIONS, SOLUTIONS(GENERAL), NUMERICAL METHODS AND PROCEDURES, PERTURBATIONS, REPRINTS

IDENTIFIERS: (U) *Difference methods, PE61102F, WUAFOSR2304A5

AD-A169 989

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 98? 9/3

TEXAS A ... M UNIV COLLEGE STATION

(U) An A... ...is of a Nonparametric Detection Scheme for Stro... ...aing Noise.,

JUL 85 7P

PERSONAL A... ...RS: Halverson,Don R. ;Wise,Gary L. ;

CONTRACT N... N00014-81-K-0146. AFOSR-82-0333

PROJECT NO 2304

TASK NO. ...5

MONITOR: ...SR
...88-0434

UNCLASSIFIED REPORT

SUPPLEMEN... NOTE: Pub. in IEEE Transactions on Informat... Theory, vIT-31 n4 p522-527 Jul 85.

ABSTRACT: ... It is shown how a modified sign detector may be ... ...ned for the nonparametric detection of a constan... ...al in strong mixing noise. An upper bound on the asy... ...ic performance of the detector is established, and the ... ...s of a detector whose performance achieves this bo... ...is specified. The optimal design of the detecto... ...ar a finite sample criterion is also conside... ...and it is shown that there is a marked differe... ...in the detector designs resulting from the two differe... ...iteria. Keywords: Nonparametric detection; Strong ... ...g noise; Modified sign detector, Reprints.

DESCRIPT... (U) *NOISE REDUCTION, *SIGNAL PROCESSING, *MIXERS ...TRONICS), CONSTANTS, MIXING, NOISE, OPTIMIZ... ..., REPRINTS, SIGNALS, ASYMPTOTIC SERIES

IDENTIFIE... (U) Nonparametric detection

AD-A168 98...

AD-A169 988 20/2 7/3

NORTH TEXAS STATE UNIV DENTON DEPT OF CHEMISTRY

(U) 8,8,8-Trinitropentacyclo(5.3.0.02,5.03,9.04,8)decane, C10H9N3O6

85 4P

PERSONAL AUTHORS: Ammon,Herman L. ;Zhang,Dechun ;Choi,C. S. ;Sandus,S. ;Marchand,A. P. ;

CONTRACT NO. AFOSR-84-0085

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR
TR-88-0370

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Acta Crystallographica, vC41 p404-406 1985.

ABSTRACT: (U) There is considerable interest in the synthesis and chemistry of strained energetic compounds. Polynitropolycyclic compounds are potineal members of this important class. In this paper, we report the structure of the first polynitrobishomocubane (I) to have been prepared. The structure of one other homocubane (homocubanecarboxylic acid p-bromoanilide has been reported.

DESCRIPTORS: (U) DECANES, *NITRO RADICALS, *POLYCYCLIC COMPOUNDS, *CRYSTAL STRUCTURE, SYNTHESIS(CHEMISTRY), MOLECULAR STRUCTURE, ENERGETIC PROPERTIES, X RAY DIFFRACTION

IDENTIFIERS: (U) *Cubanes, Cubane/Polynitrobishomo, PE61102F, WUAFOSR2308B2

AD-A168 98...

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 981 9/2

TEXAS UNIV AUSTIN DEPT OF COMPUTER SCIENCES

(U) High Performance Parallel Computing

DESCRIPTIVE NOTE: Final rept. 1 Feb 84-31 Jan 86,

JAN 86 23P

PERSONAL AUTHORS: Browne,J. C. ;Lipovski,G. J. ;

CONTRACT NO. F49620-84-C-0020

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-86-0457

UNCLASSIFIED REPORT

ABSTRACT: (U) The 1984/85 accomplishments of the research project High Performance Parallel Computing included bringing the prototype of the Texas Reconfigurable Array Computer (TRAC) to a configuration and to a state of stability where it could support execution of simple assembly language programs, initial development of a unified model of parallel computation which is a basis for a programming environment uniting process and data flow models of parallel computation, bringing to operational status on an alternative host one of the two parallel programming languages (the Computation Structures Language, CSL) originally intended for use on TRAC, exploration of the expressive capabilities of this programming language, initiation of development of a graphical programming language based on the unified model of parallel computation mentioned preceding, progress on a graphically interfaced performance modelling system for parallel computation and development of algorithms for scheduling of circuits to realize configurations in configurable banyan net- based computer architectures.

DESCRIPTORS: (U) *PARALLEL PROCESSING, COMPUTATIONS, ASSEMBLY LANGUAGES, CONFIGURATIONS, PROTOTYPES, FORTRAN, ALGORITHMS, SCHEDULING

IDENTIFIERS: (U) TRAC(Texas Reconfigurable Array Computer), CSL programming language, CSL(Computation Structures Language), PE61102F, WUAFOSR2304A3

AD-A169 981 CONTINUED

AD-A169 981

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 980 11/6 20/11

CALIFORNIA UNIV BERKELEY DEPT OF MATERIALS SCIENCE AND MINERAL ENGINEERING

(U) Fatigue Behavior of Long and Short Cracks in Wrought and Powder Aluminum Alloys.

DESCRIPTIVE NOTE: Annual rept. 15 Apr 85-1 May 86,

MAY 86 127P

PERSONAL AUTHORS: Ritchie,Robert O. ;Yu,Weikang ;

REPORT NO UCB/RP/86/A1040

CONTRACT NO AFOSR-82-0181

PROJECT NO 2306

TASK NO. A1

MONITOR: AFOSR TR-86-0447

UNCLASSIFIED REPORT

ABSTRACT: (U) The fatigue behavior of short cracks, which are small compared to the scale of the microstructure, small compared to the scale of local plasticity or simply physically small (i.e., < or = 1 mm), must be considered as one of the major factors limiting the application of defect-tolerant fatigue design for airframe and engine components. Accordingly, the current program is aimed at identifying factors which govern the growth of such short cracks (in contrast to long cracks) in a series of commercial aluminum alloys, with specific reference to behavior at near-threshold levels (below approx (00001)mm/cycle. In this annual report, the status of the program is described in terms of i) a description of results on the role of compression overloads in influencing fatigue crack growth in a new aluminum lithium alloy (2090) and a comparison of behavior with results in 2124 and 7150, ii) an evaluation of the role of crack tip shielding in controlling the growth of short (50 to 400 micrometers' through-thickness cracks and small (10 to 400 micrometers) surface cracks in 2124 and iii) a general assessment of the small crack problem. It is concluded that the near-threshold behavior of long cracks and the near- and sub threshold behavior of small cracks is strongly influenced by considerations of crack tip shielding, specifically from crack deflection and crack closure mechanisms. Other factors responsible for anomalous small crack behavior, however, can be identified and are discussed in the report.

DESCRIPTORS: (U) *ALUMINUM ALLOYS, *FATIGUE(MECHANICS), *CRACKS, DEFECTS(MATERIALS), TOLERANCES(MECHANICS), AMPLITUDE, LOADS(FORCES), CRACK PROPAGATION COMPRESSIVE PROPERTIES, LITHIUM ALLOYS, THRESHOLD EFFECTS, SHIELDING, DEFLECTION, MICROSTRUCTURE, GRAIN STRUCTURES(METALLURGY), INHIBITION, RESISTANCE, FATIQUE LIFE

IDENTIFIERS: (U) Crack closure, Crack inhibition, Aluminum lithium alloys, WUAFOSR2306A1, PE 2F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 978 5/10 8/18

ILLINOIS UNIV CHAMPAIGN COGNITIVE PSYCHOPHYSIOLOGY LAB

(U) The Event Related Brain Potential as an Index of Information Processing and Cognitive Activity. A Program of Basic Research. Supplement A. Neuromagnetic Studies.

DESCRIPTIVE NOTE: Annual progress rept. 20 Apr 84-31 Dec 85,

MAR 86 23P

PERSONAL AUTHORS: Kaufman,Lloyd ;Donchin,Emanuel ;

REPORT NO. CPL-86-1A

CONTRACT NO. F49620-85-C-0041

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR TR-86-0451

UNCLASSIFIED REPORT

ABSTRACT: (U) A study was conducted to evaluate the feasibility of obtaining concurrent measures of event-related potentials (ERPs), and event-related magnetic fields (ERFs). Subjects participated in an oddball task while simultaneous ERPs and ERFs were recorded. Isocontour field maps generated for the P300 component are consistent with the suggestion that the P300 may be generated in, or near, the hippocampal formation.

DESCRIPTORS: (U) *MAGNETOENCEPHALOGRAMS, *ELECTROENCEPHALOGRAPHY, *ELECTROPHYSIOLOGY, *INFORMATION PROCESSING, *COGNITION, BRAIN, MAGNETIC FIELDS, HIPPOCAMPUS, VISION, STIMULI, COUNTING METHODS, DIPOLES, DISCRIMINATION, NOISE, REACTION TIME

IDENTIFIERS: (U) *Event related potentials, PE61102F, WUAFOSR2313A4

AD-A169 978

AD-A169 972 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Extremal Processes, Record Times and Strong Approximation.

DESCRIPTIVE NOTE: Technical rept.,

DEC 85 15P

PERSONAL AUTHORS: Pfeifer,Dietmar ;

REPORT NO. TR-131

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0340

UNCLASSIFIED REPORT

ABSTRACT: (U) Given an i.i.d. sequence of random variables (r.v.'s) with continuous cumulative distribution function (CDF) F, the author presents a simple construction for the jump times of an extremal process on the same probability space which 'interpolate' the given record times. This gives another approach to the strong approximation of extremal processes as developed by Deheuvels (1981, 1982, 1983), and allows for a more detailed investigation of the relationship between the record times of the given sequence and the jump times of the extremal process. In particular, it is shown that the number S of surplus jump time points in (1, infinity) over the record times is approximately Poisson distributed with an exact mean of E(S) = 1 - C, C denoting Euler's constant. Keywords: Poisson approximation. (Author)

DESCRIPTORS: (U) *APPROXIMATION(MATHEMATICS), DISTRIBUTION FUNCTIONS, RANDOM VARIABLES, INTERPOLATION, PROBABILITY

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F

AD-A169 972

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 971 11/2 13/8

BATTELLE COLUMBUS DIV OH

(U) Hot Isostatic Pressing of Ceramic Powder Compacts.

DESCRIPTIVE NOTE: Final rept. 1 Jun 84-31 Dec 85,

JAN 86 174P

PERSONAL AUTHORS: McCoy,J. K. ;Markworth,A. J. ;

CONTRACT NO. AFOSR-82-0238

PROJECT NO. 2306

TASK NO A2

MONITOR: AFOSR
TR-86-0348

UNCLASSIFIED REPORT

ABSTRACT: (U) The densification of aluminum oxide in hot isostatic pressing has been studied in detail. Methods for calculating maps of densification rate as function of temperature and applied pressure have been developed. A new mechanism, interface-reaction-controlled grain-boundary diffusion, has been found which describes the densification of high-purity, fine-grained (grain radius of 0.7 micrometers) aluminum oxide powder at temperatures up to 1423 K. Theoretical models have been developed for this mechanism for both the initial and final stages of densification. Standard geometries have been used for the models; the initial stage is described in terms of impinging spherical particles, and the final stage is described in terms of isolated pores. The theoretical model is found to describe the data for fractional densities up to at least 0.9, although it breaks down for higher densities. From theoretical studies of final stage, we find indications that the discrepancy between theory and experiment is due at least in part to neglect of the effects of a distribution of pore sizes.

DESCRIPTORS: (U) *CERAMIC MATERIALS, *POWDERS, *ISOSTATIC PRESSING, *HOT PRESSING, ALUMINUM OXIDES, COMPACTING, TEMPERATURE, PRESSURE, GRAIN BOUNDARIES, SOLUTES, DIFFUSION, FINE GRAINED MATERIALS, DENSITY, RATES, MAPS, MODEL THEORY

AD-A169 971 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2306A2

AD-A169 971

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 870 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) A Negative Result About Some Concepts of Negative Dependence.

DESCRIPTIVE NOTE: Technical rept.,

JUL 85 9P

PERSONAL AUTHORS: Joag-Dev,Kumar ;Proschan,Frank ;

CONTRACT NO. F49620-85-C-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0454

UNCLASSIFIED REPORT

ABSTRACT: (U) It seems that either a very strong negative dependence holds with the monotonicity condition while without it, even a somewhat weak condition does not hold. This brings out the crucial role played by the PF2 (log concave density) property in conditional negative dependence.

DESCRIPTORS: (U) *RANDOM VARIABLES, *DISTRIBUTION, PROBABILITY, REAL NUMBERS

IDENTIFIERS: (U) *Negative dependence, Conditional distribution, WUAFOSR2304A5, PE61102F

AD-A169 870

AD-A169 988 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) A Structure Theorem on Bivariate Positive Quadrant Dependent Distributions and Tests for Independence in Two-Way Contingency Tables.

DESCRIPTIVE NOTE: Technical rept.,

DEC 85 62P

PERSONAL AUTHORS: Rao,M. B. ;Krishnaiah,P. R. ; Subramanyam,K. ;

REPORT NO. TR-85-48

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0344

UNCLASSIFIED REPORT

ABSTRACT: (U) In this paper, the set of all bivariate positive quadrant dependent distributions with fixed marginals is shown to be compact and convex. Extreme points of this convex set are enumerated in some specific examples. Applications are given in testing the hypothesis of independence against strict positive quadrant dependence in the context of ordinal contingency tables. Various procedures based upon certain functions of the eigenvalues of a random matrix are also proposed for testing for independence in two-way contingency table. The performance of some tests one of which is based on eigenvalues of a random matrix is compared.

DESCRIPTORS: (U) *BIVARIATE ANALYSIS, THEOREMS, DISTRIBUTION FUNCTIONS, EIGENVALUES, HYPOTHESES, ASYMPTOTIC SERIES, RANDOM VARIABLES

IDENTIFIERS: (U) Positive quadrant dependent distributions, Asymptotic distributions, Compact sets, Convex sets, Contingency tables, Power functions, Hypothesis of independence, WUAFOSR2304A5, PE61102F

AD-A169 988

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 984 20/13 20/3

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER PITTSBURGH PA

(U) High Specific Heat Dielectrics and Kapitza Resistance at Dielectric Boundaries.

DESCRIPTIVE NOTE: Annual rept. 1 Aug 83-30 Sep 85.

SEP 85 417P

PERSONAL AUTHORS: Eckels,P. W. ;Lawless,W. N. ;Parker,J. H. , Jr.;Patton,B. R. ;Clark,C. F. ;

CONTRACT NO F49620-83-C-0128

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR TR-86-0477

UNCLASSIFIED REPORT

ABSTRACT: (U) This program has two efforts: Kapitza and thermal properties studies. Two separate Kapitza conductance test facilities have been designed and fabricated for both solid solid and for solid liquid HE measurements. Preliminary data has been obtained for copper to T lambda C lambda interface conductance and also for KBr and LiF thermal conductance to Helium II. For the latter two materials, the test dewars were designed to allow cleaving of the samples under liquid helium. The Kapitza conductance of both samples was very near the phonon radiation limit providing strong evidence that the anomalous Kapitza conductance is not the result of surface contamination. Thermal properties work has included the measurement of the specific heat and thermal conductivity of the CdCr2O4 spinels and of several CsC lambda structure heavy metal halides in the temperature range of 1.5 to 35K. The specific heat data for the spinels was analyzed in terms of both lattice phonons and magnetic contributions. The dependence of the spinel's thermal conductivity on magnetic fields up to 15T was studied and magnetocaloric data has been obtained. For both the Zn and Cd spinels, the lattter results showed a paramagnetic behavior with demagnetization cooling and magnetization heating. Theory has been developed to explain some of the magnetocaloric effects in the new spinels, CdCr2O4 and ZnCr2O4.

DESCRIPTORS: (U) *LIQUID HELIUM, *THERMAL CONDUCTIVITY, *THERMAL RESISTANCE, BEHAVIOR, BOUNDARIES, CONDUCTIVITY, COOLING, COPPER, DEMAGNETIZATION, DEWAR FLASKS, DIELECTRICS, HEATING, HIGH TEMPERATURE, LIMITATIONS, MAGNETIC FIELDS, MAGNETIZATION, PARAMAGNETISM, PHONONS, RADIATION, RANGE(EXTREMES), SPECIFIC HEAT, SPINEL, TEMPERATURE, TEST FACILITIES, THERMAL PROPERTIES, POTASSIUM COMPOUNDS, BROMIDES, LITHIUM FLUORIDES, ZINC COMPOUNDS, CADMIUM COMPOUNDS

IDENTIFIERS: (U) *Kapitza resistance, Helium 2, WUAFOSR2301A7, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 983 8/11 18/3

MACKAY SCHOOL OF MINES RENO NV SEISMOLOGICAL LAB

(U) Attenuation in the Western Great Basin.

DESCRIPTIVE NOTE: Final rept. 1 Oct 84-30 Jun 85,

FEB 86 122P

PERSONAL AUTHORS: Priestley,Keith ;

CONTRACT NO. F49620-83-C-0012, ARPA Order-4397

MONITOR: AFOSR
TR 86-0376

UNCLASSIFIED REPORT

ABSTRACT: (U) In comparing teleseismic P wave delays in the vicinity of the Central Nevada Test Site in Hot Creek Valley, NV, with P-delay data over a wider region in the Great Basin we found that upper mantle speeds under Hot Creek Valley stations are higher than the average for the Great Basin as a whole, but lower than those beneath Pahute Mesa. These observations indicate that the caldera complex in Hot Creek Valley may have a high speed root similar to that proposed to exist beneath the Silent Canyon caldera at Pahute Mesa. In constrast, the Hot Creek Valley anomaly is not as strong as the Pahute mesa anomaly. The shadow zone caused by the Pahute Mesa structure is much more pronounced and consequently magnitudes of Pahute mesa explosions can be underestimated relative to the magnitude of Hot Creek Valley explosions of similar yield. Spectral amplitudes for 24 events of the Mammoth Lakes earthquakes sequence have been determined for the frequency range 0.1-10.0 Hz, including the M sub L 6 earthquake at 1450 UT on May 27, 1980. We have found nothing in the spectra of this event nor in the spectra of the aftershocks to distinguish them from spectra of 'tectonic' earthquakes. However, the spectra themselves do not distinguish between various possible explanations for the non-double-couple source mechanism observed in moment tensor inversion and first motion data for the largest events of the Mammoth Lakes earthquake sequence. Journal reprints are included as appendices.

DESCRIPTORS: (U) *PRIMARY WAVES(SEISMIC WAVES), *STRUCTURAL GEOLOGY, *EARTH CRUST, EARTH MANTLE, VELOCITY,

AD-A169 983

AD-A169 983 CONTINUED

ATTENUATION, ANOMALIES, SEISMIC DATA, DELAY, NUCLEAR EXPLOSION TESTING, YIELD(NUCLEAR EXPLOSIONS), ESTIMATES, SPECTRA, SOURCES, NUCLEAR EXPLOSION DETECTION, EARTHQUAKES, BASINS(GEOGRAPHIC), NEVADA, CALIFORNIA, REPRINTS

IDENTIFIERS: (U) Great Basin Province, Seismic velocity, Calderas, Upper mantle, Seismic magnitude, Nevada Test Site, PE81101F

AD-A169 983

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 960 20/5

ILLINOIS UNIV AT URBANA CHARGED PARTICLE RESEARCH LAB

(U) Optical Pumping of High Power Lasers with an Array of Plasma Pinches

DESCRIPTIVE NOTE: Final rept. 1 Nov 81-31 Oct 84,

APR 86 31P

PERSONAL AUTHORS: Kim,Kyekyoon K. ;

CONTRACT NO. AFOSR-82-0017

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR
TR-86-0479

UNCLASSIFIED REPORT

ABSTRACT: (U) Two dense plasma focus systems, the hypocycloidal pinch and the Mather type were investigated as the potential excitation light sources for high energy, short wavelength lasers. Using the hypocycloidal pinch (HCP), extensive lasing experiments were successfully performed, for the first time, on organic dyes producng results indicative of the capabilities and limitations the HCP system as an optical pump. A proof of principle lasing experiment was also performed for the first time using the Mather type dense plasma focus (MDPF) sucsessfully. Results thus fare indicate that both HCP and MDPF are excellent high energy, short wavelength optical pumps and that as an optical pump, the MDPF system is more versatile, efficient, and powerful than the HCP system, especially in the short wavelength spectral region.

DESCRIPTORS: (U) *OPTICAL PUMPING, *PINCH EFFECT, *DYE LASERS, DENSITY, DYES, EXCITATION, FOCUSING, HIGH ENERGY, HIGH POWER, LIGHT SOURCES, ORGANIC COMPOUNDS, PLASMAS(PHYSICS), SHORT WAVELENGTHS

IDENTIFIERS: (U) *Blue green lasers, HCP(Hypocycloidal Pinch), MDPF(Matter-type Dense Plasma Focus), Laser dye 490, Rhodamine 6G dye, Coumarin 480 dye, Coumarin 504 dye, PE61102F, WUAFOSR2301A8

AD-A169 960

AD-A169 959 12/2

NORTH CAROLINA UNIV AT CHAPEL HILL CURRICULUM IN OPERATIONS RESEARCH AND SYSTEMS ANALYSIS

(U) Maximum Flow and Critical Cutset as Descriptors of Multi-State Systems with Randomly Capacitated Components.

DESCRIPTIVE NOTE: Technical rept.,

MAR 86 35P

PERSONAL AUTHORS: Fishman,George S. ;

REPORT NO. UNC/ORSA/TR-86-/1

CONTRACT NO. AFOSR-84-0140

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0385

UNCLASSIFIED REPORT

ABSTRACT: (U) Let G = (V,E,s,t) denote a directed network with node set V, arc set E = (1,...,n), source node s and sink node t. Let gamma denote the set of all minimal s-t cutsets and B1 (tau), ..., Bn(tau), the random arc capacities at time tau with known joint probability distribution function. Let lambda (tau) denote the maximum s-t flow at time tau and D(tau), the corresponding critical minimal s-t cutset. Let omega denote a set of minimal s-t cutsets. This paper describes a comprehensive Monte Carlo sampling plan for efficiently estimating the probability that D (tau) epsilon omega subset of gamma and x < lambda (tau) < or = y at time tau and the probability that D (tau) epsilon omega given that x < lambda (tau) < or = y at time tau. The proposed method makes use of a readily obtainable upper bound on the probability that lambda (tau) > x to gain its computational advantage. Techniques are described for computing confidence intervals and credibility measures for assessing that specified accuracies have been achieved. The paper includes an algorithm for performing the Monte Carlo sampling experiment, an example to illustrate the technique and a listing of all steps

AD-A169 959

OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 858 CONTINUED

needed for implementation. (Author)

DESCRIPTORS: (U) *NETWORK FLOWS, *MONTE CARLO METHOD, *SAMPLING, ALGORITHMS, ESTIMATES, RELIABILITY, PROBABILITY DISTRIBUTION FUNCTIONS, NODES, COMPUTATIONS, CONFIDENCE LIMITS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

AD-A168 858 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Nonparametric Sequential Estimation of Zeros and Extrema of Regression Functions.

DESCRIPTIVE NOTE: Technical rept.,

JAN 88 18P

PERSONAL AUTHORS: Haerdle,Wolfgang ;

REPORT NO. TR-133

CONTRACT NO., F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0400

UNCLASSIFIED REPORT

ABSTRACT: (U) Let (X,Y), (X sub 1, Y sub 1), (X sub 2, Y sub 2, ... be independent, identically distributed, bivariate random variables and let m(x)=E(Y/X=x) be the regression curve of y on X. This paper considers the estimation of zeros and extrema of the regression curve via stochastic approximation methods. The author presents consistency results of some sequential procedures and define termination rules providing fixed width confidence intervals for the parameters to be estimated. Keywords: kernel regression; nonparametric regression. (Author)

DESCRIPTORS: (U) *ESTIMATES, *APPROXIMATION(MATHEMATICS), *NONPARAMETRIC STATISTICS, REGRESSION ANALYSIS, DISTRIBUTION CURVES, RANDOM VARIABLES, BIVARIATE ANALYSIS, SEQUENCES(MATHEMATICS), STOCHASTIC PROCESSES, KERNEL FUNCTIONS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 957 6/1 6/16

COLORADO STATE UNIV FORT COLLINS COLL OF VETERINARY MEDICINE AND BIOMEDICAL SCIENCES

(U) Characterization of the Sites Phosphorylated on Tyrosine Hydroxylase by Ca(2+) and Phospholipid-Dependent Protein Kinase, Calmodulin-Dependent Multiprotein Kinase and Cyclic AMP-Dependent Protein Kinase.

MAR 86 6P

PERSONAL AUTHORS: Vulliet,P. R. ;Woodgett,James R. ; Ferrari,Stefano ;Hardie,D. G. ;

CONTRACT NO. AFOSR-84-0122

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR TR-86-0450

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in FEBS Letters, v192 n2 p335-339 Mar 86.

ABSTRACT: (U) This communication identifies the phosphorylation sites on tyrosine hydroxylase, the rate limiting enzyme in the biosynthesis of the catecholamine neurotransmitters. The phosphorylation of the enzyme by the calcium and phospholipid dependent protein kinase (protein kinase C) is established and it is reported that both protein kinase C and cyclic AMP dependent protein kinase C and cyclic AMP dependent protein kinase phosphorylate the identical site on the enzyme.

DESCRIPTORS: (U) *OXIDOREDUCTASES, *PHOSPHORYLATION, *CALCIUM, *PHOSPHORUS TRANSFERASES, TYROSINE, SITES, CATIONS, PHOSPHOLIPIDS, PROTEINS, ADENOSINE PHOSPHATES, NEUROCHEMICAL TRANSMISSION, BIOSYNTHESIS, CATECHOLAMINES, ACETYLCHOLINE, REPRINTS

IDENTIFIERS (U) *Kinases, Calmodulin, AMP(Adenosine Monophosphate), Cyclic AMP, PE61102F, WUAFOSR2312A1

AD-A169 957

AD-A169 955 12/1

PITTSBURGH UNIV PA INST FOR COMPUTATIONAL MATHEMATICS AND APPLICATIONS

(U) Estimation of the Error in the Reduced Basis Method Solution of Nonlinear Equations,

OCT 85 11P

PERSONAL AUTHORS: Porsching,T. A. ;

CONTRACT NO. AFOSR-80-0178

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR TR-86-0473

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Mathematics of Computation, v45 n172 p487-496 Oct 85.

ABSTRACT: (U) The reduced basis method is a projection technique for approximating the solution curve of a finite system of nonlinear algebraic equations by the solution curve of a related system that is typically of much lower dimension. In this paper, the reduced basis error is shown to be dominated by an approximation error. This, in turn, leads to error estimates for projection onto specific subspaces; for example, subspaces related to Taylor, Lagrange and discrete least-squares approximation. (Author)

DESCRIPTORS: (U) *PROJECTIVE TECHNIQUES, *ESTIMATES, NONLINEAR ALGEBRAIC EQUATIONS, CURVATURE, ERRORS, APPROXIMATION(MATHEMATICS), REPRINTS

IDENTIFIERS: (U) *Reduced basis method, PE61102F, WUAFOSR2304A3

AD-A169 955

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 953 12/1

PITTSBURGH UNIV PA DEPT OF MATHEMATICS AND STATISTICS

(U) Moving Average Models with Bivariate Exponential and Geometric Distributions.

DESCRIPTIVE NOTE: Technical rept.,

MAR 86 22P

PERSONAL AUTHORS: Langberg,Naftali A. ;Stoffer,David S. ;

REPORT NO. TR-86-02

CONTRACT NO. AFOSR-84-0113

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0408

UNCLASSIFIED REPORT

ABSTRACT: (U) Two classes of finite and infinite moving average sequences of bivariate random vectors are considered. The first class has bivariate exponential marginals while the second class has bivariate geometric marginals. The theory of positive dependence is used to show that in various cases the two classes consist of associated random variables. Association is then applied to establish moment inequalities and to obtain approximations to some joint probabilities of the bivariate processes. (Author)

DESCRIPTORS: (U) *STATISTICAL DISTRIBUTIONS, *SEQUENCES(MATHEMATICS), *MATHEMATICAL MODELS, BIVARIATE ANALYSIS, RANDOM VARIABLES, APPROXIMATION(MATHEMATICS), GEOMETRY, EXPONENTIAL FUNCTIONS

IDENTIFIERS: (U) *Moving average models, PE61102F, WUAFOSR2304A5

AD-A168 950 22/2 12/1

CALIFORNIA UNIV LOS ANGELES DEPT OF ELECTRICAL ENGINEERING

(U) A Mathematical Formulation of a Large Space Structure Control Problem.

DESCRIPTIVE NOTE: Interim rept.,

SEP 85 8P

PERSONAL AUTHORS: Balakrishnan,A. V. ;

CONTRACT NO. AFOSR-83-0318

PROJECT NO. 9769

TASK NO. 01

MONITOR: AFOSR
TR-86-0444

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper presents an abstract-mathematical formulation of a Large Space Structure Control problem. The physical apparatus consists of a softly supported antenna attached to the space shuttle by a flexible beam-like truss. The control objective is to slew the antenna on command within the given accuracy and maintaining stability. The control forces and torques are applied at the shuttle end as well as the antenna end and in addition provision is made for a small number of 2-axis proof-mass actuators along the beam. The beam motion is modelled by partial differential equations. Of the variety of Control problems possible we touch only on the time-optimal probable. (Author)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *SPACE SHUTTLES, *APPLIED MATHEMATICS, EQUATIONS OF MOTION, HILBERT SPACE, ANTENNAS, TRUSSES, DAMPING, PARTIAL DIFFERENTIAL EQUATIONS

IDENTIFIERS: (U) WUAFOSR976901, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 948 11/6 20/11

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF AERONAUTICS AND ASTRONAUTICS

(U) Finite Element and Experimental Studies of Creep Crack Initiation of RENE-88 Superalloy

DESCRIPTIVE NOTE: Final rept. 1 Sep 82-28 Feb 86.

FEB 86 62P

PERSONAL AUTHORS: Pian,Theodore H. ;Sifre,Pedro J. ;Lee, Michael J. ;

CONTRACT NO AFOSR-82-0320

PROJECT NO 2307

TASK NO. B2

MONITOR: AFOSR TR-86-0488

UNCLASSIFIED REPORT

ABSTRACT: (U) A study was made of crack initiation due to localized creep action for a nickel-base superalloy RENE 88. Crack initiation times of single-edge-notched specimens and circumferentially notched axisymmetric specimens were determined experimentally under constant loads and a given elevated temperature. Corresponding finite element analyses using assumed stress hybrid elements were made to determine the stress and strain histories up to the crack initiation times. Through the study of specimens with notches of different geometries at different loading levels a large range of stress and strain parameters were covered. It has been found that the only parameter that falls on a narrow band when plotted against the initiation time is the magnitude of maximum equivalent stress at the time of crack initiation.

DESCRIPTORS: (U) *NICKEL ALLOYS, *SUPERALLOYS, *CREEP, *CRACKING(FRACTURING), RUPTURE, CRACK PROPAGATION, NOTCH SENSITIVITY, LOADS(FORCES), HIGH TEMPERATURE, STRESSES, STRAIN(MECHANICS), FINITE ELEMENT ANALYSIS

IDENTIFIERS (U) Nickel alloy RENE 88, PE61102F

AD-A169 948

AD-A169 941 6/5 6/16 6/10

ESSEX CORP ORLANDO FL

(U) Eye Movements as an Index of Mental Workload.

DESCRIPTIVE NOTE: Final rept. 15 Jul 85-14 Mar 86 on Phase 1.

MAR 86 20P

PERSONAL AUTHORS: May,James G. ;Kennedy,Robert S. ; Williams,Mary C. ;Dunlap,William P. ;Brannan,Julie R. ;

CONTRACT NO. F49620-85-C-0121

PROJECT NO. 3005

TASK NO. A1

MONITOR. AFOSR TR-86-0418

UNCLASSIFIED REPORT

ABSTRACT: (U) Two investigations were carried out to assess the feasibility of using eye movement measures as nonintrusive indicants of mental workload. In the first experiment, measures of saccadic latency and eye movement velocity were obtained during alternating eye movement scans while subjects were differentially task loaded by simple, moderate, and complex auditory tone counting. The latency and eye movement velocity measures changed but did not differ reliably as tone counting complexity (workload) was increased. In the second experiment, the spatial extent of spontaneous saccades was measured under three levels of tone counting complexity. The results indicated that the extent of such eye movements varied inversely (p less than .0151) as tone counting complexity increased. This index appears to hold promise for the development of an objective indicator of mental workload. (Author)

DESCRIPTORS: (U) *EYE MOVEMENTS, *MENTAL ABILITY, AUDIO TONES, COUNTING METHODS, HEARING, INDEXES, INDICATORS, INFRARED TRACKING, PERFORMANCE(HUMAN), SCANNING, VELOCITY, WORKLOAD

IDENTIFIERS: (U) MUAFOSR3005A1, PE61102F

AD-A169 941

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 840 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) Ordering Distributions by Scaled Order Statistics.

DESCRIPTIVE NOTE: Technical rept.,

JUN 85 18P

PERSONAL AUTHORS: Scarsini,Marco ;Shaked,Moshe ;

CONTRACT NO. AFOSR-84-0250

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0354

UNCLASSIFIED REPORT

ABSTRACT: (U) Motivated by applications in reliability theory, we define a preordering of nonnegative random vectors by requiring a to be stochastically smaller than the k th order statistic of a sub 1 y sub 1, ..., a sub n y sub n for all choices of a sub i > 0, i = 1, 2, ..., n.

DESCRIPTORS: (U) *ORDER STATISTICS, DISTRIBUTION, STOCHASTIC PROCESSES, RELIABILITY, VECTOR ANALYSIS

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F

AD-A169 840

AD-A169 839 12/1

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

(U) A Nonparametric Quantile Estimator: Computation.

DESCRIPTIVE NOTE: Technical rept.,

MAY 86 21P

PERSONAL AUTHORS: Padgett,W. J. ;

REPORT NO. TR-117, 82005-9

CONTRACT NO. AFOSR-84-0186, MIPR-ARO-138-85

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0360

UNCLASSIFIED REPORT

ABSTRACT: (U) Right-censored data arise very naturally in life testing and reliability studies. For such data, it is important to be able to obtain good nonparametric estimates of various characteristics of the unknown lifetime distribution. This report concerns the computational procedure for a kernel-type nonparametric estimator of the quantile function of the lifetime distribution from right-censored data. This estimator was suggested by Padgett (1986), extending the complete sample results of Yang (1985). The large sample properties of the estimator, such as asymptotic normality and mean square convergence, were studied by Lio, Padgett and Yu (1986) and by Lio and Padgett (1985). In this report, a procedure for calculation of the kernel-type quantile estimate from right-censored data is described, and a listing of a computer program in FORTRAN code is provided.

DESCRIPTORS: (U) *ESTIMATES, *NONPARAMETRIC STATISTICS, COMPUTATIONS, BANDWIDTH, COMPUTER PROGRAMS, FORTRAN, BIAS, CONFIDENCE LIMITS

IDENTIFIERS: (U) Quantile functions, Smoothing(Mathematics), Bootstrap method, WUAFOSR2304A5, PE61102F

AD-A169 839

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A189 938 12/1

ARIZONA UNIV TUCSON

(U) Inequalities for Probability Contents of Convex Sets via Geometric Average.

DESCRIPTIVE NOTE: Technical rept.,

NOV 88 18P

PERSONAL AUTHORS: Shaked,Moshe ;Tong,Y. L. ;

CONTRACT NO. AFOSR-84-0208, NSF-MCS82-00098

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0389

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Georgia Inst. of Tech., Atlanta. Grants NSF-MCS81-00776 and NSF-DMS85-02346

ABSTRACT: (U) This paper derives such an inequality for a large class of density functions and a large class of convex sets. The most general results are given for the bivariate case. An extention to the n-dimensional case appears to be difficult except for some special cases such as the case of independent identically distributed random variables or when the underlying joint density is spherically symmetric. The class of convex sets considered includes D sub infinity and D sub 2 as special cases and special applications are given for elliptically contoured distributions and scale parameters families. In all these cases, universal upper bounds on the probability contents can be given by substituting the values of the a sub i's by their geometric mean.

DESCRIPTORS (U) *INEQUALITIES, PROBABILITY, CONVEX SETS, DENSITY, BIVARIATE ANALYSIS, PERMUTATIONS, INVARIANCE, RANDOM VARIABLES

IDENTIFIERS (U) *Density functions, Schur concavity, WUAFOSR2304A5, PE61102F

AD-A189 938

AD-A189 937 12/1

MARYLAND UNIV COLLEGE PARK DEPT OF MATHEMATICS

(U) Zero-Crossings Analysis.

DESCRIPTIVE NOTE: Technical rept.,

JAN 88 73P

PERSONAL AUTHORS: Kedem,Benjamin ;

CONTRACT NO. AFOSR-82-0187

PROJECT NO. 2304

TASK NO. A5

MONITOR. AFOSR
TR-88-0413

UNCLASSIFIED REPORT

ABSTRACT: (U) A coherent development of zero crossing based methods and theory appropriate for fast signal analysis are advanced. Quite a few ideas pertaining to zero crossing counts found in the literature can be expressed and interpreted with the help of this more general setup. A central issue addressed in some detail, is the fruitful connection which exists between zero crossing counts and linear filtering. This connection is explored and interpreted with the help of a certain zero crossing spectral representation, is then applied in spectral analysis, detection and discrimination. Zero crossing counts in filtered time series are called higher order crossings. The thrust of the work is that higher order crossings analysis provides a useful descriptive as well as analytical tool that can in many respects match spectral analysis. To a great extent these two types of analysis are in fact equivalent, but each emphasizes a different point of view. Advantages offered by higher order crossings are great simplicity and a drastic data reduction.

DESCRIPTORS: (U) *DETECTION, *TIME SERIES ANALYSIS, *SPECTRUM ANALYSIS, *CROSSINGS, COHERENCE, DATA REDUCTION, FILTERS, LINEAR FILTERING, SIGNALS

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F

AD-A189 937

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 936 20/9 20/7

COLORADO UNIV AT BOULDER CO DEPT OF ASTROPHYSICAL SCIENCE

(U) Ion Transport in Beam-Plasma Interactions.

DESCRIPTIVE NOTE: Final rept. 30 Sep 83-29 Mar 85,

MAY 85 12P

PERSONAL AUTHORS: Stern,R. A. ;

REPORT NO. 153-3223-F

CONTRACT NO. AFOSR-83-0328

MONITOR: AFOSR TR-86-0423

UNCLASSIFIED REPORT

ABSTRACT: (U) The project is concerned with the interaction of ion beams and plasmas, and their mutual destabilization. The goal is to characterize this interaction using novel diagnostic techniques. In the experiment, a gas discharge plasma was to be constructed through which ions could be accelerated. A two laser system would be assembled and variations of laser induced fluorescence (LIF) diagnostics used to measures the changes in ion properties of the beam and the plasma consequent on the instability.

DESCRIPTORS: (U) *ION BEAMS, *PLASMA DIAGNOSTICS, BEAMS(RADIATION), DIAGNOSIS(GENERAL), GAS DISCHARGES, INTERACTIONS, ION EXCHANGE, IONS, PLASMAS(PHYSICS), TRANSPORT PROPERTIES, LASER INDUCED FLUORESCENCE

IDENTIFIERS: (U) Plasma instabilities

AD-A169 936

AD-A169 935 12/1

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

(U) Smooth Nonparametric Quantile Estimation under Censoring: Simulations and Bootstrap Methods.

DESCRIPTIVE NOTE: Technical rept.,

MAY 88 29P

PERSONAL AUTHORS: Padgett,W. J. ;Thombs,L. A. ;

REPORT NO. TR-118, 82N05-17

CONTRACT NO. AFOSR-84-0158, MIPR-ARO-139-85

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0431

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives of this paper are two-fold. One is to report results of extensive Monte Carlo simulations which demonstrate the behavior of the mean squared error of the kernel estimator with respect to bandwidth. These simulations provide a method of choosing an optimal bandwidth when the form of the lifetime and censoring distributions are known. Also, they compare the kernel-type estimator with the product-limit qauntile estimator. Five commonly used parametric lifetime distributions, two censoring mechanisms, and four different kernel functions are considered in this study, which is an extension of the brief simulations for exponential distributions reported by Padgett (1988). The second objective is to present a nonparametric method for bandwidth selection based on the bootstrap for right-censored data. This data-based procedure used the bootstrap to estimate mean squared error, and is both an extension and modification of the methods proposed by Padgett. Bandwidth selection using the bootstrap is important for small and moderately large samples since no exact expressions exist for the mean squared error of the kernel-type quantile estimator.

DESCRIPTORS: (U) *ESTIMATES, *NONPARAMETRIC STATISTICS,

AD-A169 935

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 935 CONTINUED

MONTE CARLO METHOD, ASYMPTOTIC NORMALITY, KERNEL FUNCTIONS, BANDWIDTH, CONFIDENCE LIMITS

IDENTIFIERS (U) *Quantile functions, Bootstrap method, Smoothing (mathematics), Lifetime distribution, AUAFOSR, 304A8, PE61102F

AD-A169 934 8/10 8/18

NEW YORK UNIV N Y

(U) Perceptual Factors in Workload: A Neuromagnetic Study.

DESCRIPTIVE NOTE: Annual rept. no. 1, 1 Jan-31 Dec 85,

FEB 86 55P

PERSONAL AUTHORS: Kaufman,Lloyd ;Williamson,Samuel J. ;

CONTRACT NO. F49620-85-K-0004

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR TR-86-0417

UNCLASSIFIED REPORT

ABSTRACT: (U) A background section describes the neuromagnetic method and its history. There were an elevation of N1 and P2 (using a quasi-steady state stimulus). The fields associated with these sources increased in intensity during attention. This is not due to the activity of sources recruited during attention, but to modulated activity of neurons in or near primary auditory cortex. This is consistent with a Triesman like filter theory of attention. Also, physical parameters of stimulation, e.g., loudness, have little or no effects. However, the effect is sharply diminished when both stimuli are presented to both ears with equal loudness. A collaboration with other investigators is planned to compare our results with results obtained in a more conventional manner. A new method for obtaining graded levels of attention is described. A visual experiment is underway, and is giving us similar results. A single-position method for determining the location, orientation and strength of the dipole source is described. This method will be applied to a P300 study, which will follow-up an odd-ball study just completed. The latter gave results similar to those obtained previously, but the method is sufficiently insensitive to determine if changing P300 latency is due to a change in source. The planned experiment should make this possible.

DESCRIPTORS: (U) *ATTENTION, *HEARING, *NEUROPHYSIOLOGY,

AD-A169 935

AD-A169 934

AD-A188 934 CONTINUED

•MAGNETOENCEPHALOGRAMS, DIPOLES, LOUDNESS, PERCEPTION, SOURCES, STIMULI, THEORY, VISION, WORKLOAD, MAGNETOMETERS, ELECTROENCEPHALOGRAPHY, COMPUTER APPLICATIONS, TOMOGRAPHY, MAGNETIC RESONANCE, IMAGE PROCESSING, NERVE TRANSMISSION, AUDITORY PERCEPTION

IDENTIFIERS: (U) Neuromagnetism, Event related potentials, AUAFOSR2313A4, PE81102F

AD-A188 933 7/4

TORONTO UNIV (ONTARIO) LASH MILLER CHEMICAL LABS

(U) Study in Molecular Lasers.

DESCRIPTIVE NOTE: Final rept. 1 Jun 84-31 May 85,

AUG 85 7P

PERSONAL AUTHORS: Burns,George ;

CONTRACT NO. AFOSR-84-0127

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-86-0422

UNCLASSIFIED REPORT

ABSTRACT: (U) Principal progress was achieved in the field classical studies of diatom dissociation. 3-D trajectory calculations of dissociating bromine and fluorine were conducted over a range of temperatures, and using several significantly different potential energy surfaces. A library consisting over a two million trajectories was accumulated. These trajectories were used to test the strong collision assumption, important in several theories of unimolecular reactions and in some theories of thermal diatom dissociation. The assumption was shown to be not valid for the case of dissociating bromine and fluorine. Properties of the steady state of dissociating diatoms were investigated. Papers, now in preparation, involve study of nonequilibrium energy and angular momentum distribution functions; accumulation, interpretation and classification of data on inelastic and reactive collisions; and study of scaling factors and vibrational-rotational coupling in dissociating diatoms. Experiments, still in progress, aimed at measuring recombination rates of fluorine atoms. Time delayed photoelectric effect was explained in terms of a release of trapped electrons at the surface of photocathode.

DESCRIPTORS: (U) •DIATOMIC MOLECULES, •CHEMICAL DISSOCIATION, •RECOMBINATION REACTIONS, •BROMINE, •FLUORINE, TRAJECTORIES, THREE DIMENSIONAL, TEMPERATURE, POTENTIAL ENERGY, SURFACES, COLLISIONS, ELECTRON TRANSFER,

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 933 CONTINUED

MOLECULAR VIBRATION, MOLECULAR ROTATION, PHOTOELECTRIC EFFECT, ARGON

IDENTIFIERS (U) Atom molecule interactions, MUAFOSR2303B1, PE61102F

AD-A169 932 12/1

GEORGIA INST OF TECH ATLANTA

(U) Extreme Values of Birth and Death Processes and Queues,

MAR 86 28P

PERSONAL AUTHORS: Serfozo,Richard F. ;

CONTRACT NO. AFOSR-84-0367

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0384

UNCLASSIFIED REPORT

ABSTRACT: (U) This document studies the asymptotic behavior of maximum values of birth and death processes over large time intervals. In most cases, the distributions of these maxima, under standard linear normalizations, either do not converge or they converge to a degenerate distribution. However, by allowing the birth and death rates to vary in a certain manner as the time interval increases, we show that the maxima do indeed have three possible limit distributions. Two of these are classical extreme value distributions and the third one is a new distribution. This third distribution is the best one for practical applications. Our results are for transient as well as recurrent birth and death processes and related queues. For transient processes, the focus is on the maxima conditioned that they are finite. (Author)

DESCRIPTORS: (U) *STATISTICAL DISTRIBUTIONS, *TIME INTERVALS, QUEUEING THEORY, VALUE, CONVERGENCE, ASYMPTOTIC NORMALITY

IDENTIFIERS: (U) *Birth and death processes, MUAFOSR2304A5, PE61102F

AD-A169 933

AD-A169 932

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 931 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Validity of Edgeworth Expansions of Minimum Constrast Estimators for Gaussian ARMA Processes.

DESCRIPTIVE NOTE: Technical rept.,

DEC 85 45P

PERSONAL AUTHORS: Taniguchi,Masanobu ;

REPORT NO. TR-85-48

CONTRACT NO. F49620-85-C-0008

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0398

UNCLASSIFIED REPORT

ABSTRACT: (U) Let (X sub t) be a Gaussian Autoregression Multivariant Analysis (ARMA) process with spectral density f sub p (lambda), where p is an unknown parameter. To estimate multivariant analysis we propose a minimum contrast estimation method which includes the maximum likelihood method and the quasi-maximum likelihood ethod as special cases. Let p-bar sub T be the minimum contrast estimator of p. Then we derive the Edgeworth expansion of the distribution of p-bar sub T up to third order, and provide its validity. By this Edgeworth expansion we can see that this minimum contrast estimator is always second-order asymptotically efficient in the class of second-order asymptotically median unbiased estimators. Also the third-order asymptotic comparisons among minimum contrast estimators will be discussed.

DESCRIPTORS: (U) *MULTIVARIATE ANALYSIS, *REGRESSION ANALYSIS CONTRAST, ESTIMATES, MAXIMUM LIKELIHOOD ESTIMATION, GAUSSIAN QUADRATURE, ASYMPTOTIC SERIES, STOCHASTIC PROCESSES

IDENTIFIERS: (U) ARMA(Autoregression Multivariate Analyses), Edgeworth expansion, MUAFOSR2304A5, PE61102F

AD-A169 931

AD-A169 930 9/2

MASSACHUSETTS UNIV AMHERST DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Yield and Performance Enhancement through Redundancy in VLSI and WSI Multi-Precessor Systems.

DESCRIPTIVE NOTE: Technical rept.,

86 52P

PERSONAL AUTHORS: Koren,Israel ;Pradhan,Dhiraj K. ;

CONTRACT NO. AFOSR-84-0052

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR-86-0389

UNCLASSIFIED REPORT

ABSTRACT: (U) New challenges have been brought to fault-tolerant computing and processor architecture research because of developments in IC technology. One emergent area is development of architectures, built by interconnecting a large number of processing elements on a single chip or wafer. Two important areas, related to such VLSI processor arrays, are the focus of this paper; they are fault-tolerance, and yield improvement techniques. Fault-tolerance in these VLSI processor arrays is of real practical significance; it provides for much-needed reliability improvement. Therefore, we first describe the underlying concepts of fault-tolerance at work in these multi-processor systems. These precepts are useful to then present certain techniques that will incorporate fault-tolerance integrally into the design. In the second part of the paper we discuss models that evaluate how yield enhancement and reliability improvement may be achieved by certain fault-tolerant techniques. (Author)

DESCRIPTORS: (U) *FAULT TOLERANT COMPUTING, MULTIPROCESSORS

IDENTIFIERS: (U) VLSI(Very Large Scale Integration), MUAFOSR2304A2, PE61102F

AD-A169 930

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 928 8/2

WISCONSIN UNIV-MADISON DEPT OF COMPUTER SCIENCES

(U) SOR (Successive Over-Relaxation) MGR (Multigrid Algorithm)(nu) Experiments on the Crystal Multicomputer.

JAN 86 49P

PERSONAL AUTHORS: Kamowitz,David ;

CONTRACT NO AFOSR-82-0278, NSF-MCS81-05904

PROJECT NO 2304

TASK NO. A3

MONITOR: AFOSR TR-86-0411

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes distributed implementations of the red/black SOR algorithm and of the MGR(nu) multigrid algorithm on the Crystal multicomputer. Rates of convergence and observed efficiencies for both algorithms are compared. Keywords: Distributed computing; Multigrid algorithm, Successive overrelaxation method.

DESCRIPTORS (U) *ALGORITHMS, *MULTIPROCESSORS, BLACK(COLOR), EFFICIENCY, LINEAR SYSTEMS, CONVERGENCE, RATES, RED(COLOR), DIFFERENTIAL EQUATIONS, SOLUTIONS(GENERAL), ITERATIONS

IDENTIFIERS (U) *Implementation, *Multicomputers, AUAFOSR2304A3, PE61102F

AD-A168 928

AD-A168 928 20/11 22/2

MASSACHUSETTS INST OF TECH CAMBRIDGE MA SPACE SYSTEMS LAB

(U) Development of Finite Active Control Elements for Large Flexible Space Structures.

DESCRIPTIVE NOTE: Annual rept. 18 Mar 83-14 May 84,

JUN 85 225P

PERSONAL AUTHORS: Miller,David W. ;Crawley,Edward F. ;

REPORT NO. MIT-SSL-6-85

CONTRACT NO. F49620-83-K-0028

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR TR-86-0480

UNCLASSIFIED REPORT

ABSTRACT: (U) A quasi free-free beam, simulating a flexible space structure, was equipped with inertial proof-mass actuators and sensors capable, in principle, of functioning in the space environment. Then tuning rules were derived which determine the optimal actuator passive stiffness and damping which minimizes the control effort required while increasing the modal damping in the structure. Active control using two local and one component level processor was demonstrated next. Lastly, multi-input, single output collocated feedback tests were performed. Optimal passive vibration absorber designs were derived to provide maximum structural damping. Theoretically, addition of an absorber mass equaling 0.5% of structural mass can result in a single mode structural damping ratio of 5%. Analysis of multimode damping using a single absorber indicated that the absorber stiffness should be tuned to the lowest mode in order to maximize the achievable damping in all the modes. Passive actuator components and active feedback gains were derived simultaneously and sequentially yielding identical results whose passive components equal those of the passive vibration absorber. Passive absorber and active feedback damping tests were performed. A single mode

AD-A168 928

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 828 CONTINUED

damping ratio of 4.2% was achieved by adding 2.3% of structural mass: 77% of which corresponds to 'dead' absorber mass. Multi-input, single-output control provided damping ratios ranging from 2% to 3%. This functioning collocated control element, composed of actuators, sensors and local and component level processors, constitutes the first stage of research and experimentation into distributed, hierarchic active control of elastic structural behavior.

DESCRIPTORS: (U) *DAMPING, *FLEXIBLE STRUCTURES, *BEAMS(STRUCTURAL), VIBRATION, SPACE ENVIRONMENTS, ACTUATORS, PASSIVE SYSTEMS, TUNING, FEEDBACK, STIFFNESS, ENERGY ABSORBERS, STRUCTURAL RESPONSE, CONTROL SYSTEMS, DETECTORS, HIERARCHIES, DISTRIBUTION, ELASTIC PROPERTIES, MASS, SPACE TECHNOLOGY, SIMULATION

IDENTIFIERS: (U) *Flexible space structures, Active control, Active damping, Active feedback gain, Distributed control, Hierarchic control, Modal damping, Vibration absorbers, PE61102F, WUAFOSR2302B1

AD-A169 828 12/1

GEORGIA INST OF TECH ATLANTA

(U) Heredity of Stationary and Reversible Stochastic Processes.

DESCRIPTIVE NOTE: Technical rept.,

MAR 86 6P

PERSONAL AUTHORS: Serfozo,Richard F. ;

CONTRACT NO. AFOSR-84-0367

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0381

UNCLASSIFIED REPORT

ABSTRACT: (U) When a stochastic process (a random measure, set, field, etc. on a group) is stationary, ergodic, or reversible, then certain functions of this process inherit these properties. This document presents sufficient conditions for this inheritance. (Author)

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, QUEUEING THEORY, TRANSFORMATIONS(MATHEMATICS), STATIONARY, REVERSIBLE, ERGODIC PROCESSES, INVARIANCE

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

AD-A169 828 11/4 11/2 22/2

CALIFORNIA UNIV LOS ANGELES DEPT OF MATERIALS SCIENCE AND ENGINEERING

(U) New Materials for Spacecraft Stability and Damping - A Feasibility Study.

DESCRIPTIVE NOTE: Final technical rept. 1 Oct 83-30 Sep 84.

NOV 85 52P

PERSONAL AUTHORS: Mackenzie,John D. ;

CONTRACT NO AFOSR-83-0221

PROJECT NO 2303

TASK NO. A3

MONITOR: AFOSR TR-86-0308

UNCLASSIFIED REPORT

ABSTRACT: (U) A preliminary feasibility study has been conducted on some new materials for use as structure components of spacecrafts. These included some new glasses, glass-ceramics, fibers and composites such as low expansion copper aluminosilicate glasses, hollow and oval glass fibers and hollow fiber-glass-polymer composites. The low temperature expansion coefficients, elastic moduli and damping constants were measured. Recommendations are made for further research and development of some selected materials which appeared to be promising candidates for spacecraft structures.

DESCRIPTORS: (U) *GLASS FIBERS, *GLASS, COEFFICIENTS, CONSTANTS, DAMPING, EXPANSION, LOW TEMPERATURE, MODULUS OF ELASTICITY, SPACECRAFT, STABILITY, STRUCTURAL MEMBERS, STRUCTURES, CERAMIC MATERIALS, COPPER, GLASS REINFORCED PLASTICS, THERMAL EXPANSION, TEMPERATURE COEFFICIENTS, SPACECRAFT COMPONENTS

IDENTIFIERS (U) Aluminosilicate glass, Hollow fibers, Oval fibers, Damping materials, Engineering materials, MUAFOSR2303A3, PE61102F

AD-A169 828

AD-A169 752 7/4 7/3

VIRGINIA INST OF MARINE SCIENCE GLOUCESTER POINT DEPT OF CHEMICAL OCEANOGRAPHY

(U) Investigation of Deviations from Ideality in the Two Liquid Phase Region of Systems of Medium Molecular Weight Hydrocarbon Mixtures and Water.

DESCRIPTIVE NOTE: Final rept. 1 Jan 83-31 Dec 85.

FEB 86 115P

PERSONAL AUTHORS: Burris,David R. ;MacIntyre,William G. ;

CONTRACT NO. AFOSR-83-0038

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-86-0397

UNCLASSIFIED REPORT

ABSTRACT: (U) Two-phase systems of liquid hydrocarbon mixture, containing medium molecular weight aromatic and aliphatic hydrocarbons, and water were examined in both equilibrium and kinetic experiments. Knowledge of the aqueous solution behavior of liquid hydrocarbon mixtures is important in determining the fate of hydrocarbon components of fuels and petroleum in environmental release situations. The equilibrium solute concentration for a component is given by the product of the pure compound solubility, its mole fraction in the hydrocarbon phase and its activity coefficient in the hydrocarbon phase. Hydrocarbon phase activity coefficients determined for binary hydrocarbon mixtures using static vapor pressure measurements (at 20 and 70 degs.) and those determined using water solubility results (at 20 and 70 degs.) did not differ significantly. This indicated that component aqueous phase activity coefficients did not decrease measurably in the presence of hydrocarbon co-solutes, in contradiction to some previously published observations, and that the presence of water in the hydrocarbon phase was not significant at these temperatures. Methods for predicting multicomponent mixture solubilities were demonstrated. Aqueous solution behavior of mixtures containing a chlorinated hydrocarbon

AD-A169 752

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 752 CONTINUED

or a fatty acid surfactant was also determined.

DESCRIPTORS: (U) *HYDROCARBONS, *REACTION KINETICS, *SOLUBILITY, MIXTURES, WATER, AROMATIC HYDROCARBONS, ALIPHATIC HYDROCARBONS, MOLECULAR WEIGHT, CHEMICAL EQUILIBRIUM, LIQUID PHASES, SOLUTES, THERMODYNAMICS, VAPOR PRESSURE, TEMPERATURE, CHLORINATED HYDROCARBONS, FATTY ACIDS, SURFACE ACTIVE SUBSTANCES, CONCENTRATION(CHEMISTRY), COEFFICIENTS, BINARY COMPOUNDS

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2

AD-A169 752

AD-A169 747 11/6 20/11

CALIFORNIA UNIV DAVIS DEPT OF MECHANICAL ENGINEERING

(U) Fundamental Investigations of Failure during Superplastic Forming Process.

DESCRIPTIVE NOTE: Final rept. 1 Feb 82-31 Jan 86,

APR 86 91 P

PERSONAL AUTHORS: Mukherjee,Amiya K. ;

CONTRACT NO. AFOSR-82-0081

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR TR-86-0482

UNCLASSIFIED REPORT

ABSTRACT: (U) The experimental work on both the base alpha-beta alloy (Ti-6Al-4V) and the Ni-modified alloy (Ti-6Al-4V-2Ni) showed that there is significant microstructural evolution during superplastic deformation. These structural evolutions affect the parameters for the constitutive equation for superplasticity. Contrary to model prediction, the strain rate sensitivity is found to be a function of temperature, in a way that exactly parallels the dependence of beta-volume fraction on temperature. An empirical equation has been proposed to characterize the non-steady state microstructure in terms of the dependence of strain hardening coefficient on temperature and strain rate. The maximum attainable ductility in this alloy is associated with a dynamic balance between strain hardening (due to grain growth) and strain softening (due to in situ grain refinement). The 7475-TR6 aluminum alloy (heat B) undergoes significant level of strain hardening due to increase in dislocation density as a function of strain. The grains do not remain equiaxed (which is contrary to most supposition of superplasticity). One does not observe a true steady-state in the microstructure during superplastic deformation. The activation energy of deformation is equal to that for volume diffusion, possibly due to the necessity of the dislocations to climb over the Cr-rich particles. The alloy cavitates

AD-A169 747

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 747 CONTINUED

extensively due to decohesion of the intermetallic particle/grain boundary interface.

DESCRIPTORS: (U) *TITANIUM ALLOYS, *ALUMINUM, *VANADIUM, *METALWORKING, ACTIVATION ENERGY, BALANCE, CLIMBING, COEFFICIENTS, DEFORMATION, DENSITY, DIFFUSION, DISLOCATIONS, DUCTILITY, DYNAMICS, EQUATIONS, EVOLUTION(GENERAL), FAILURE, GRAIN GROWTH, GRAIN STRUCTURES(METALLURGY), MICROSTRUCTURE, MODELS, PLASTIC PROPERTIES, PREDICTIONS, REFINING, SENSITIVITY, STEADY STATE, STRAIN HARDENING, STRAIN RATE, STRAIN(MECHANICS), TEMPERATURE, VOLUME, NICKEL

IDENTIFIERS: (U) Titanium alloy 6Al 4V, Titanium alloy 6Al 4V 2Ni, PE61102F, WUAFOSR2306A1

AD-A169 747

AD-A169 717 12/1 9/4

CONNECTICUT UNIV STORRS DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

(U) Outlier Resistant Filtering and Smoothing.

DESCRIPTIVE NOTE: Interim rept. 1 Jul 85-30 Jun 86,

APR 88 69P

PERSONAL AUTHORS: Tsaknakis,Haralampos ;Patantoni-Kazakos, P. ;

REPORT NO. UCT/DEECS/TR-86-6

CONTRACT NO. AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0365

UNCLASSIFIED REPORT

ABSTRACT: (U) Consider a stationary Gaussian information process transmitted through an additive noise channel. Assume that the noise and information processes are mutually independent, and model the noise process as nominally Gaussian with additive independent outliers. For the above system model, one first develop a theory for outlier resistant filtering and smoothing operations. Then design specific such nonlinear operations, and study their performance. The performance criteria are asymptotic mean squared error at the Gaussian model, the breakdown point, and the influence function. The operations combine excellent at the nominal model performance, with strong resistance to outliers. Keywords: Filtering; Smoothing; Qualitative robustness; Outlier Resistance.

DESCRIPTORS: (U) *INFORMATION PROCESSING, *MATHEMATICAL FILTERS, *STOCHASTIC PROCESSES, CHANNELS, NOISE, NONLINEAR SYSTEMS, OPERATION, RESISTANCE, GAUSSIAN QUADRATURE

IDENTIFIERS: (U) Outliers(Statistics), Robust procedures, Smoothing, PE61102F, WUAFOSR2304A5

AD-A169 717

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 695 5/10

CALIFORNIA UNIV IRVINE CENTER FOR THE NEUROBIOLOGY OF LEARNING AND MEMOR

(U) Conference on the Neurobiology of Learning and Memory (2nd).

DESCRIPTIVE NOTE: Final rept. 1 Jul 84-30 Jun 85,

MAY 86 82P

PERSONAL AUTHORS: McGaugh,James L. ;

CONTRACT NO. N00014-84-G-0108

UNCLASSIFIED REPORT

ABSTRACT: (U) Funds from this grant provided partial support for the Second Conference on the Neurobiology of Learning and Memory which was organized by the Center for the Neurobiology of Learning and Memory at the University of California, Irvine, and was held on October 6-9, 1984. The symposium focussed on three major topics: Brain systems and learning; Comparative aspects of learning and memory; and Learning, memory and cognitive processes. The program consisted of presentations by 18 major speakers and 83 poster presentations, and was attended by over 300 participants.

DESCRIPTORS: (U) *NEUROBIOLOGY, *LEARNING, *MEMORY(PSYCHOLOGY), BRAIN, CALIFORNIA, COGNITION, SYMPOSIA, COMPARISON

AD-A169 640 7/4 20/12

DAYTON UNIV OH RESEARCH INST

(U) Symposium on Applied Surface Analysis (7th) Held in College Park, Maryland on 15-17 May 1985.

DESCRIPTIVE NOTE: Final rept. 18 Mar 85-30 Mar 86,

JUL 86 55P

PERSONAL AUTHORS: Grant,John T. ;

REPORT NO. UDR-TR-86-60

CONTRACT NO. N00014-85-C-0118

UNCLASSIFIED REPORT

ABSTRACT: (U) Areas receiving special attention at this symposium were: chemical bonding and reactions at metal-semiconductor interfaces; surface analysis and the tribological processes of ion implanted materials; microbeam analysis; and laser ionization of sputtered neutrals. Other topics discussed included adsorption, adhesion, corrosion, wear, and thin films. The proceedings of the symposium have been published in a special issue of the journal: Applied Surface Science. (Abstracts)

DESCRIPTORS: (U) *SEMICONDUCTORS, *SURFACE ANALYSIS, *SURFACE CHEMISTRY, ABSTRACTS, ADHESION, ADSORPTION, CHEMICAL BONDS, CORROSION, INTERFACES, ION IMPLANTATION, IONIZATION, LASERS, MATERIALS, METALS, MICROBEAMS, SURFACES, SYMPOSIA, THIN FILMS

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 468 17/2 14/4

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING

(U) Reliability Analysis of a Communication Network with Multimode Components.

APR 86 8P

PERSONAL AUTHORS: Ch.iou,Shen-Nang ;Li,Victor O. ;

CONTRACT NO AFOSR-84-0268

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR 86-0331

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at IEEE INFOCOM, Miami, FL, 7-10 Apr 86

ABSTRACT: (U) This paper presents a model to calculate the reliability of communication networks with multimode components. Previous research on network reliability has focused on models in which each component may be in one of two modes, than two modes. Traditional network reliability measures, such as the probability that a pair of nodes is connected, are not meaningful in a multimode model. Therefore, the mean message delay of the network is defined as the performance measure. An exact calculation of this reliability measure is not feasible due to the large number of network states, corresponding to network components being in different modes. We have developed an approximation method to calculate this reliability measure. This method requires us to work with the states of the network in order of decreasing probability. An algorithm ORDER-M is developed to generate these states in the proper order.

DESCRIPTORS (U) *COMMUNICATIONS NETWORKS, DELAY, MEAN, MESSAGE PROCESSING, MODELS, MULTINODE, NETWORKS, NODES, PARTS, RELIABILITY, RELIABILITY(ELECTRONICS), MATHEMATICAL MODELS, REPRINTS

IDENTIFIERS (U) WUAFOSR2304A5

AD-A169 468

AD-A169 113 10/2

TEXAS TECH UNIV LUBBOCK PULSED POWER LAB

(U) Coordinated Research Program in Pulsed Power Physics.

DESCRIPTIVE NOTE: Annual rept. 10 Jan 84-31 Oct 85.

DEC 85 202P

PERSONAL AUTHORS: Kristiansen,M. ;Schaefer,G. ;Schoenbach, K. ;Kroepholz,H. ;

CONTRACT NO. AFOSR-84-0032

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR TR-86-0305

UNCLASSIFIED REPORT

ABSTRACT: (U) The program's, related to pulsed power research, main emphasis is on gaining a better understanding of repetitive opening and closing switch phenomena. The main effort is on diffuse discharge opening switch phenomena. The main effort is on diffuse discharge opening switches but considerable progress has also been made on understanding and describing fundamental, transient discharge phenomena. Some effort has also been given to studies of electrode erosion and insulator damage in high power closing switches. In addition several smaller studies have considered various novel ideas and concepts to determine their potential for further investigations. Keywords: Pulsed power; Diffuse discharges; Opening switches; Laser triggering; Surface discharges; Field distortion; Streak photography; X ray triggering.

DESCRIPTORS: (U) *PULSE GENERATORS, *ELECTRIC SWITCHES, *TRIGGER CIRCUITS, *ELECTRODES, *EROSION, ELECTRIC DISCHARGES, PULSE RATE, LASER APPLICATIONS, ELECTRIC ARCS, SPARK GAPS, SWITCHES, DIFFUSION, HIGH POWER, OPENING(PROCESS), POWER, PULSES, STREAK CAMERAS, DISTORTION, TRANSIENTS, X RAYS

IDENTIFIERS: (U) PE61102F, WUAFOS2301A7

AD-A169 113

AD-A168 108 12/1

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

(U) On the Bounded Regret of Empirical Bayes Estimators.

DESCRIPTIVE NOTE: Technical rept.,

MAY 86 21P

PERSONAL AUTHORS: Yu,Kai F. ;

REPORT NO. TR-112

CONTRACT NO. AFOSR-84-0158

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0276

UNCLASSIFIED REPORT

ABSTRACT: (U) In the first Jerzy Neyman Memorial Lecture, Robbins (1983) has outlined a wide class of problems concerning the general empirical Bayes approach and the linear empirical Bayes approach to estimation. This paper studies a special case which includes several important standard distributions. Specifically let (theta, x) be a random vector such that theta has a distribution function G, and the conditional expectation of x given theta satisfies E(x/theta) = theta. Suppose it is desired to use a linear function A+Bx of the observed x to estimate the unknown parameter theta.

DESCRIPTORS: (U) *BAYES THEOREM, *ESTIMATES, FUNCTIONS(MATHEMATICS), LINEARITY, DISTRIBUTION FUNCTIONS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

AD-A168 108

AD-A168 073 17/9 17/3

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) A High Resolution Algorithm for Combined Time-of-Arrival and Direction-of-Arrival Estimation.

DESCRIPTIVE NOTE: Rept. for 1984-1985,

NOV 85 5P

PERSONAL AUTHORS: Spielman,Daniel ;Paulraj,A. ;Kailath, Thomas ;

CONTRACT NO. AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR-86-0266

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Asilomar Conference Proceedings, 6 Nov 85.

ABSTRACT: (U) Over the past few years several high resolution methods for direction finding with passive arrays have been developed. In this paper, we use one the these methods, the MUSIC algorithm, to solve a two dimensional radar problem. Namely, given an antenna array and a transmitter which emits finite duration pulses, we wish to determine both the range and direction of multiple targets from the backscattered echoes. We show how the MUSIC algorithm can be adapted to this situation. Simulations are presented which show good performance. Keywords: High resolution algorithm; Time-of-arrival; Direction-of-arrival estimation; Antenna array; Radar and sonar applications. (Reprints)

DESCRIPTORS: (U) *DIRECTION FINDING, *ALGORITHMS, *RADAR TRACKING, ANTENNA ARRAYS, ESTIMATES, HIGH RESOLUTION, PASSIVE SYSTEMS, RADAR, REPRINTS, SONAR, TARGETS, TIME, TWO DIMENSIONAL, PROBLEM SOLVING, RADAR TRANSMITTERS, RADAR PULSES, BACKSCATTERING, RADAR ANTENNAS, TARGET ECHOES

IDENTIFIERS: (U) MUSIC algorithm, PE61102F,

AD-A168 073

AD-A169 073 CONTINUED

MUAFOSR2304A5

AD-A169 072 9/3

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) A Time-Domain Signal Resolution Problem.

DESCRIPTIVE NOTE: Rept. for 1984-1985.

APR 86 5P

PERSONAL AUTHORS: Bruckstein,A. M. ;Shan,T. J. ;Kailath,T. ;

CONTRACT NO. AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0272

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in ICASSP Conference Proceedings, Apr 86.

ABSTRACT: (U) This reprint presents a time-domain method for estimating the number and delay times for overlapping signals with a priori known shape, from noisy observations received by a sensor. The method is based on a recently developed eigenstructure technique for multiple direction finding with sensor arrays and exploits the structure of the received signal to variance matrix. The method presented also solves more general problems of signal detection and resolution. Keywords: MUSIC(Multiple Signal Characterization); Overlapping echoes; and MUSIC algorithm.

DESCRIPTORS: (U) *SIGNAL PROCESSING, *TIME DOMAIN, DIRECTION FINDING, OVERLAP, RESOLUTION, DELAY, TIME, REPRINTS, DETECTION, SIGNALS, ALGORITHMS, ARRAYS, DETECTORS, REPRINTS

IDENTIFIERS: (U) MUSIC(Multiple Signal Characterization), MUSIC algorithm, PE61102F, MUAFOSR2304A5

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A169 060 11/6 20/11

CALIFORNIA UNIV BERKELEY

(U) International Conference/Workshop on Small Fatigue Cracks (2nd) Held in Santa Barbara, California on 5-10 January 1986.

DESCRIPTIVE NOTE: Final rept.,

MAR 86 31P

PERSONAL AUTHORS: Ritchie,Robert O. ;Lankford,James ;

CONTRACT NO. DAAG29-85-G-0110, AFOSR-85-0356

MONITOR: ARO,AFOSR
23038.1-MS-CF,TR-86-0508

UNCLASSIFIED REPORT

ABSTRACT: (U) This document provides a description and technical summary of the Second International Engineering Foundation Conference/Workshop on Small Fatigue Cracks, held in Santa Barbara, California, 5-10 January, 1986. It provides a current assessment of the pertinent issues with respect to definition, differences in behavior compared to long cracks, environmental effects, driving forces for small crack extension, intrinsic thresholds, and the application of small crack methodology to life prediction and alloy design. A listing of the conference participants and the technical program are appended to the report

DESCRIPTORS: (U) *FATIGUE(MECHANICS), ALLOYS, CALIFORNIA, CRACKS, ENVIRONMENTAL IMPACT, INTERNATIONAL, METHODOLOGY, SYMPOSIA, WORKSHOPS, CRACK PROPAGATION, CRACKING(FRACTURING)

AD-A169 060

AD-A169 047 6/16 6/1

CALIFORNIA UNIV IRVINE CENTER FOR THE NEUROBIOLOGY OF LEARNING AND MEMOR

(U) Effects of Acetylcholinesterase Inhibition on Cholinergic Transmission in the Hippocampal Slice.

DESCRIPTIVE NOTE: Final rept. 1 Apr 82-30 Sep 85,

APR 86 25P

PERSONAL AUTHORS: Lynch,Gary ;

CONTRACT NO. AFOSR-82-0116

PROJECT NO. 2312

TASK NO. A3

MONITOR: AFOSR
TR-86-0298

UNCLASSIFIED REPORT

ABSTRACT: (U) This work is concerned with the mechanisms used by brain cells to change their functional interconnections and the possibility that these are also involved in neuropathology. Three inter-related questions were studied: 1) what effects are produced in target neurons by prolonged exposure to neurotransmitters (e.g., acidic amino acids, acetylcholine); 2) does partial degradation of the submembrane cytoskeleton by calcium-activated proteases (calpain) effect synaptic organization; 3) are second messenger systems with known effects on growth (trophic) responses in peripheral tissues activated by intense physiological events in brain. Prolonged exposure of brain slices to acidic amino acid transmitters causes functional desensitization of extra-synaptic receptors, and a very potent inhibition of the second messenger system normally activated by cholinergic receptor. 2) Experiments concerned with synaptic structural proteins (brain spectrin or fodrin) and a proteolytic enzyme (calpain) that digests them produced the following results: a) degradation of spectrin by calpain changes irreversibly amino acid receptors; b) calpain is concentrated in synaptic regions; c) calpain-spectrin interactions in a test system (red blood cells) result in pronounced morphological changes; d) spectrin is rapidly synthesized, inserted into

AD-A169 047

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 047 CONTINUED

membrane domains, and apparently digested by calpain; e) the calpain-fodrin interaction is accelerated by calmodulin

DESCRIPTORS: (U) •NEUROCHEMICAL TRANSMISSION, •CHOLINESTERASE INHIBITORS, •HIPPOCAMPUS, ACETYLCHOLINE, ACETYLCHOLINESTERASE, ACTIVATION, AMINO ACIDS, BRAIN, CHOLINERGIC NERVES, DEGRADATION, DESENSITIZING, ERYTHROCYTES, GROWTH(GENERAL), INHIBITION, MOLECULAR STRUCTURE, NERVE CELLS, NERVOUS SYSTEM, PATHOLOGY, POTENCY, PROTEINS, REGIONS, SENSE ORGANS, SYNAPSE, TISSUES(BIOLOGY), EXPOSURE(PHYSIOLOGY), MEMBRANES(BIOLOGY)

IDENTIFIERS: (U) Proteases, PE61102F, WUAFOSR2312A3

AD-A168 020 9/2

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Adaptive Resolution of Overlapping Echoes,

NOV 85 7P

PERSONAL AUTHORS: Shan,T. J. ;Bruckstein,A. M. ;Kailath,T. ;

CONTRACT NO. DAAG29-79-C-0215, DAAG29-81-K-0057

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0268

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Asilomar Conference, 6 Nov 85.

ABSTRACT: (U) We present a new adaptive method for estimating the arrival times for overlapping pulses with a priori known shape, from the noisy observations received by a sensor. The method is an adaptive version of an off-line technique based on the eigenstructure method for resolution of overlapping echoes. This problem is important in various applications such as radar and sonar data processing, geophysical/seismic exploration and biomedical engineering. In these applications a known signal is used to probe a medium and the returning response - in the form of delayed overlapping echos in noise - has to be processed to yield information on the nature and location of scatterers.

DESCRIPTORS: (U) •SIGNAL PROCESSING, •ECHOES, ADAPTIVE SYSTEMS, BIOMEDICINE, DATA PROCESSING, ENGINEERING, GEOPHYSICAL PROSPECTING, OFF LINE SYSTEMS, RADAR, RESOLUTION, SEISMOLOGY, SONAR, ARRIVAL, TIME, ESTIMATES, PULSES, DELAY, SCATTERING, SONAR SIGNALS, RADAR SIGNALS, REPRINTS

IDENTIFIERS: (U) Overlapping echoes, Arrival time, Adaptive resolution, Eigenstructure method, RF modulated signals, PE61102F, WUAFOSR23[illegible]4A5

AD-A168 047

AD-A168 020

AD-A168 943 8/2

MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

(U) An Optimal Instruction-Scheduling Model for a Class of Vector Processors.

DESCRIPTIVE NOTE: Technical rept.,

NOV 85 18P

PERSONAL AUTHORS: Arya,Siamak ;

CONTRACT NO. AFOSR-84-0086

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR
TR 86-0313

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Computers, vc-34 n11 p981-995 Nov 85.

ABSTRACT: (U) An integer programming model that portrays the architectural features of a class of vector and array processors has been developed. This model is used to produce optimal schedules for low-level-instruction codes of such processors. Optimal schedules are produced for both straight codes and instruction loops. Loop scheduling is separately considered because of special consideration that must be given to the effects of the instructions of consecutive loop iterations on each other that are hidden when static instruction scheduling approach is used. Using the model, a number of experiments have been conducted in optimal scheduling of Cray assembly codes. Keywords: Reprints; Computer architecture (Author)

DESCRIPTORS: (U) *INTEGER PROGRAMMING, ARRAYS, ASSEMBLY, CODING, COMPUTER ARCHITECTURE, COMPUTER PROGRAMMING, INSTRUCTIONS, LOOPS, OPTIMIZATION, PROCESSING EQUIPMENT, REPRINTS, SCHEDULING, COMPUTERIZED SIMULATION

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A3

AD-A168 943

AD-A168 942 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Weak Convergence of the Variations, Iterated Integrals, and Doleans-Dade Exponentials of Sequences of Semimartingales.

DESCRIPTIVE NOTE: Technical rept.; Sep 85-Aug 86,

MAR 86 8P

PERSONAL AUTHORS: Avram,F. ;

REPORT NO. TR-135

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0327

UNCLASSIFIED REPORT

ABSTRACT: (U) This document investigates the weak convergence of variations, iterated integrals and Doleans Dade exponentials. V sub k (Y), I sub k (Y) and E(gamma Y) are called respectively the variations, the iterated integrals and the Doleans-Dade exponential of the semimartingale Y.

DESCRIPTORS: (U) *WEAK CONVERGENCE, EXPONENTIAL FUNCTIONS, INTEGRALS, VARIATIONS, SEQUENCES(MATHEMATICS), ITERATIONS

IDENTIFIERS: (U) Semimartingales, PE61102F, WUAFOSR2304A5

AD-A168 942

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A188 941 12/1

SOUTH CAROLINA UNIV COLUMBIA DEPT OF STATISTICS

(U) Asymptotically Optimal Bandwidth Selection for Kernel Density Estimators from Randomly Right-Censored Samples

DESCRIPTIVE NOTE: Technical rept.,

MAR 88 27P

PERSONAL AUTHORS: Marron,J. S. ;Padgett,W. J. ;

REPORT NO. TR-113

CONTRACT NO AFOSR-84-0168

PROJECT NO 2304

TASK NO. A5

MONITOR: AFOSR
TR-88-0277

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper makes two important contributions to the theory of bandwidth selection for kernel density estimators under right censorship. First, an asymptotic representation of the integrated squared error into easily understood variance and squared bias components is given. Second, it is shown that if the bandwidth is chosen by the data-based method of least squares cross-validation, then it is asymptotically optimal in a compelling sense. A by-product of the first part is an interesting comparison of the two most popular kernel estimators. Keywords: Nonparametric density estimation; Smoothing parameter.

DESCRIPTORS (U) *ESTIMATES, *KERNEL FUNCTIONS, BANDWIDTH, CENSORSHIP, DATA BASES, DENSITY, NONPARAMETRIC STATISTICS, SELECTION, THEORY, LEAST SQUARES METHOD

IDENTIFIERS (U) PE61102F, WUAFOSR2304A5

AD-A188 941

AD-A188 883 8/20 8/13

STATE UNIV OF NEW YORK AT BINGHAMTON DEPT OF BIOLOGY

(U) Membrane Alterations Following Toxic Chemical Insult.

DESCRIPTIVE NOTE: Final rept. 15 Jul 84-14 Jan 88.

MAR 88 6P

PERSONAL AUTHORS: Liss,Alan ;

CONTRACT NO. AFOSR-84-0248

PROJECT NO. 2917

TASK NO. A4

MONITOR: AFOSR
TR-88-0298

UNCLASSIFIED REPORT

ABSTRACT: (U) A procaryotic cell system has been developed that can be used to determine the toxic action of chemicals acting at the level of the eucaryotic or procaryotic cytoplasmic membrane. Cell wall-less microbes known as mycoplasmas are used. In this current study, two perfluorinated fatty acids (c8 and c10) were found to inhibit the growth of the test mycoplasmas. Two apparent activities were observed. At high concentrations (> 10 mM) a detergent-like action was noted. At low concentrations (< 10 mM) cell death was observed without detectable cell lysis. Altering the cell membrane (the presumed target of the toxic compounds) resulted in altered levels of toxicity. The nature of the toxic action of the perfluorinated fatty acids is currently being investigated using sodium dodecyl sulfate polyacrylamide gel electrophoresis, high performance liquid chromatography and microbiological procedures (such as selecting toxin resistant mutants). Keywords: Mycoplasmas; Fluorocarbons; Toxic Chemicals.

DESCRIPTORS: (U) *TOXICITY, *FLUORINATED HYDROCARBONS, *FATTY ACIDS, *MEMBRANES, *MYCOPLASMA, CYTOPLASM, CELLS(BIOLOGY), CONCENTRATION(COMPOSITION), HIGH RATE, MICROBIOLOGY, FLUORINATION, CHEMICALS, TOXICITY, MUTATIONS, DEATH, GROWTH(GENERAL), HIGH RESOLUTION, LIQUID CHROMATOGRAPHY, RESISTANCE, TOXINS AND ANTITOXINS

AD-A188 883

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 883 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A4

AD-A168 888 20/11 22/2

MEA CAMBRIDGE MA

(U) Wave Propagation and Dynamics of Lattice Structures.

DESCRIPTIVE NOTE: Annual rept. 1 Apr 83-30 Apr 84,

MAY 84 208P

PERSONAL AUTHORS: Williams,James H. , Jr.;Eng,Freddie C. ; Lee,Samson S. ;

CONTRACT NO. F49620-83-C-0092

PROJECT NO. 2307

TASK NO. B1

MONITOR: AFOSR TR-86-0281

UNCLASSIFIED REPORT

ABSTRACT: (U) The application of the transfer matrix method to the analysis of wave propagation and vibration in periodic structures is introduced. Analyses of a one-dimensional rod, a three-bay planar lattice structure and a three-dimensional tetrahedral truss are given to illustrate the general approach in applying the transfer matrix method. In addition, a numerical example is given. The frequency response functions for specific locations in a one-dimensional rod due to an excitation at a particular location are obtained using a basic language computer program. The responses at one location in the rod due to an impulse excitation, a square pulse excitation and a triangular pulse excitation at a second location are also obtained. Ke/words: Large space structures.

DESCRIPTORS: (U) *SPACECRAFT, *LATTICE DYNAMICS, *STRUCTURAL ANALYSIS, COMPUTER PROGRAMS, EXCITATION, FREQUENCY RESPONSE, FUNCTIONS, ONE DIMENSIONAL, POSITION(LOCATION), PROGRAMMING LANGUAGES, PULSES, RODS, SQUARE WAVES, STRUCTURES, THREE DIMENSIONAL, TRUSSES, VIBRATION, WAVE PROPAGATION, TRANSFER FUNCTIONS, MATRICES(MATHEMATICS)

IDENTIFIERS: (U) BASIC programming language, PE61102F, WUAFOSR2307B1

AD-A168 883

AD-A168 888

AD-A168 866 20/12 20/2

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

(U) High Speed Compound Semiconductor Devices in Layered Structures.

DESCRIPTIVE NOTE: Final rept. 1 Jan 83-31 Dec 85,

FEB 86 68P

PERSONAL AUTHORS: Morkoc,Hadis ;

CONTRACT NO. F49620-83-K-0021

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR TR-86-0301

UNCLASSIFIED REPORT

ABSTRACT: (U) Much progress has been made in the growth of GaAs on Si GaAs MESFETs, MODFETs, HBTs, lasers on Si, modeling of MODFETs and MODFET ring oscillators, InGaAs/AlGaAs MODFETs, InGaAs hot electron transistors, GaAs/AlAs resonant tunneling transistors, single and multi quantum wells Accomplishments were reported in about 200 journal articles, 80 conference papers and 25 seminars over the past three years. Only the GaAs on Si, In sub yGa sub1-7As/AlGaAs MODFET and INGaAs hot electron transistor related research accomplishments are summarized in this document. A list of publications covering all of the research funded by the AFOSR is provided as an appendix for those who are interested. (Author)

DESCRIPTORS: (U) *SEMICONDUCTOR DEVICES, *CRYSTAL GROWTH, DOCUMENTS, GALLIUM ARSENIDES, LAYERS, OSCILLATORS, QUANTUM ELECTRONICS, RINGS, STRUCTURES, TABLES(DATA), TRANSISTORS, SILICON, SEMICONDUCTOR LASERS, MONOLITHIC STRUCTURES(ELECTRONICS), INTEGRATED CIRCUITS

IDENTIFIERS: (U) PE61102F, WUAFOSR2305C1

AD-A168 866

AD-A168 798 17/2.1

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) Multiple Signal Resolution with Uncertain Signal Subspace,

NOV 85 6P

PERSONAL AUTHORS: Shan,T. J. ;Bruckstein,A. M. ;Kailath,T. ;

CONTRACT NO. AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0267

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Asilomar Conference, nf9 5p, 6 Nov 85.

ABSTRACT: (U) An extension of the signal subspace algorithm for signal resolution is given for the case of incomplete information on the assumed 'signal subspace'. The algorithm is based on a multiplicative model of signal subspace uncertainty. In direction finding with sensor arrays this uncertainty model accounts for phase and gain perturbations in the sensors as well as for inaccurate knowledge of sensor positions. The proposed method for dealing with incomplete information on the signal subspace exploits the structure of the data model to first estimate the missing parameters by a 'signal implantation' technique. In direction finding the method amounts to using a predetermined set of signals arriving from known directions together with the signals originating at the real targets to enable on-line monitoring of sensor gain/phase perturbations and self-cohering of the signal subspace. Keywords include: Multiple signal resolution; Self-cohering arrpach; Sensor arrays; and Signal implantation technique. (Reprints)

DESCRIPTORS: (U) *SIGNAL PROCESSING, RADIO SIGNALS, ALGORITHMS, DIRECTION FINDING, MODELS, MONITORING, ON LINE SYSTEMS, REPRINTS, DETECTORS, GAIN, PERTURBATIONS, SIGNALS, DATA MANAGEMENT, MULTIPLICATION FACTOR, TARGETS,

AD-A168 798

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 796 CONTINUED

ARR*[illegible], IMPLANTATION

IDENTIFIERS: (U) *Multiple signal processing, Signal subspace, Signal implantation, MUAFOSR2304A5, PE61102F

AD-A168 796 9/1

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) Adaptive Filtering Algorithms with Automatic Gain Control,

NOV 85 6P

PERSONAL AUTHORS: Shan,T. J. ;Kailath,T. ;

CONTRACT NO. F49620-79-C-0058, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0269

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Asilomar Conference, n19 6p, 6 Nov 85.

ABSTRACT: (U) In this paper we introduce an automatic gain control (AGC) scheme for adaptive algorithms that are used extensivaly in many applications. The proposed AGC schame is realized by using an estimate of the cross correlation between adaptive error and the input signal to control the gain of the adaptive algorithm. When the cross correllation is high, the gain is also high, and the adaptive algorithm is in and 'active' state. When the error and the input signals are uncorrelated, the gain is near to zero, and the adaptive algorithm is put in an 'asleep' state. Thus, adaptive algorithms with such AGC are insensitive to disturbances appearing on the system output measurement. Such disturbances can drive conventional adaptive algorithms away from the achieved adaptation. A fast, efficient algorithm for estimation of the cross correlation coefficient of adaptive error and input is also proposed. Keywords: Apaptive filtering algorithms, Automatic gain control, Cross correlation, Channel echo-cancellation, Near-end speech.

DESCRIPTORS: (U) *ALGORITHMS, *AUTOMATIC GAIN CONTROL, *ADAPTIVE FILTERS, COEFFICIENTS, CONTROL, CROSS CORRELATION, ERRORS, INPUT, MEASUREMENT, OUTPUT, SENSITIVITY, SIGNALS, REPRINTS

AD-A168 796

AD-A168 795

AD-A168 795 CONTINUED

IDENTIFIERS: (U) WUAFOSR2304A8, PE61102F

AD-A168 794 20/14 9/5

MARYLAND UNIV COLLEGE PARK LAB FOR PLASMA AND FUSION ENERGY STUDIES

(U) Experimental and Theoretical Investigation of Microwave Millimeter Radiation from Hollow, Rotating Electron Beams.

DESCRIPTIVE NOTE: Final progress rept. 1 Dec 84-30 Nov 85,

NOV 85 109P

PERSONAL AUTHORS: Destler,William W. ;

CONTRACT NO. AFOSR-83-0013

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR TR-86-0280

UNCLASSIFIED REPORT

ABSTRACT: (U) Research on microwave generation from rotating electron beams in various conducting boundary systems has been pursued with the major emphasis being on the production of radiation from rotating electron beams in magnetron like conducting boundary systems. These experimental configurations are now recognized as an entirely new type of microwave tube, referred to in the literature as a Gyromagnetron, High Harmonic Gyrotron, or Cusp Injected Magnetron (Cusptron). The interest in this new device has centered around its potential to reduce the required magnetic field in microwave tubes by an order of magnitude by allowing operation at a high harmonic of the electron cyclotron frequency. Results from research on millimeter and submillimeter waves produced by rotating electron beams in rippled magnetic fields, are also summarized in this report.

DESCRIPTORS: (U) *ELECTRON BEAMS, *MICROWAVE TUBES, *MILLIMETER WAVES, *GYROTRONS BOUNDARIES, CYCLOTRON WAVES, ELECTRONS, FREQUENCY, MAGNETIC FIELDS, MAGNETRONS, PRODUCTION, RADIATION, THEORY

IDENTIFIERS: (U) CUSPTRON(Cusp Injected Magnetron), PE61102F, WUAFOSR2301A8

AD-A168 795

AD-A168 794

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 788 9/1

ROCKWELL INTERNATIONAL THOUSAND OAKS CA MICROELECTRONICS RESEARCH AND DEVELOPMENT CENTER

(U) LSI/VLSI Ion Implanted Planar GaAs IC Processing.

DESCRIPTIVE NOTE: Final rept. 1 Jan 83-31 Mar 85,

NOV 85 55P

PERSONAL AUTHORS: Kirkpatrick,C. G. ;

REPORT NO. MRDC41129.12FR

CONTRACT NO. F49620-83-C-0042, ARPA Order-3384

MONITOR: AFOSR TR-86-0304

UNCLASSIFIED REPORT

ABSTRACT: (U) The scope of this program was two-fold: (1) to complete and stabilize the development of a planar fabrication process for high speed digital integrated circuits on 3-inch GaAs wafers, and (2) to utilize gate arrays up to the 1k equivalent gate level as the demonstration circuits for this process development. In addition to optimizing equipment and handling techniques for 3-inch GaAs wafers, the process development task concentrated on test chip characterizations, threshold voltage uniformity control, and materials evaluation. Piezoelectrically generated device non-uniformities were a primary consideration during this time. The gate array development involved two masked sets. The first was used to establish process and design criteria for gate arrays, as well as to fabricate a 5 x 5 multiplier. The second mask set was an extension of the previous work, and was used to fabricate gate arrays of the 1k equivalent gate complexity. The Mayo Foundation provided the expertise for auto-routing and personalization techniques. (Author)

DESCRIPTORS: (U) *INTEGRATED CIRCUITS, HIGH RATE, CIRCUITS, DEMONSTRATIONS, ARRAYS, GATES(CIRCUITS), GALLIUM ARSENIDES, ION IMPLANTATION, PLANAR STRUCTURES, FABRICATION, CHIPS(ELECTRONICS), HANDLING, MATERIALS, TEST AND EVALUATION, MASKS, THRESHOLD EFFECTS, VOLTAGE

AD-A168 772 14/2

SOUTH CAROLINA UNIV COLUMBIA DEPT OF MATHEMATICS AND STATISTICS

(U) On Discrete Failure Models.

AUG 85 6P

PERSONAL AUTHORS: Padgett,W. J. ;Spurrier,John D. ;

CONTRACT NO. AFOSR-84-0158

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0315

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Reliability, vR-34 n3 p253-258 Aug 85.

ABSTRACT: (U) In some situations, discrete failure 'time' distributions are appropriate to model 'lifetimes'. For example, a discrete distribution is appropriate when a piece of equipment operates in cycles and the number of cycles prior to failure is observed. This paper provides three families of discrete parametric distributions which are versatile in fitting increasing, decreasing, and constant failure rate models to either uncensored or right-censored discrete life-test data. The maximum likelihood estimation of parameters, survival probabilities, and mean lifetime is investigated. The MLEs can be computed by simple numerical methods. (Reprints)

DESCRIPTORS: (U) *LIFE TESTS, CONSTANTS, CYCLES, DISCRETE DISTRIBUTION, FAILURE, MAXIMUM LIKELIHOOD ESTIMATION, MEAN, MODELS, NUMERICAL METHODS AND PROCEDURES, PARAMETRIC ANALYSIS, PROBABILITY, RATES, REPRINTS, SURVIVAL(GENERAL), TIME, PARAMETERS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 755 3/1 20/6

ROCHESTER UNIV NY INST OF OPTICS

(U) High Angular Resolution Stellar Interferometry.

DESCRIPTIVE NOTE: Final rept. 1 Dec 80-30 Nov 84,

JUL 85 265P

PERSONAL AUTHORS: Dainty,J. C. ;

CONTRACT NO AFOSR-81-0003

PROJECT NO 2311

TASK NO. A1

MONITOR: AFOSR
TR-86-0312

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the research carried out under the headings: Atmospheric turbulence, space-time structure of images, speckled speckle, detection of gratings behind diffusers, the phase problem, infrared speckle interferometry and phase conjugation.

DESCRIPTORS (U) *INTERFEROMETRY, *OPTICAL INTERFEROMETERS, *OPTICAL PROCESSING, *ASTRONOMY, ATMOSPHERIC MOTION, DETECTION, DIFFUSERS, GRATINGS(SPECTRA), INFRARED RADIATION, SPACE PERCEPTION, SPECULAR REFLECTION, OPTICAL IMAGES, SPECULAR REFLECTION

IDENTIFIERS (U) Phase conjugation, PE61102F, WUAFOSR2311A1

AD-A168 755

AD-A168 753 19/4 20/10 20/4

CALIFORNIA UNIV DAVIS DEPT OF APPLIED SCIENCE

(U) Fundamental Study of Dense-Fluid Detonation.

DESCRIPTIVE NOTE: Final rept. Apr 81-Sep 85,

SEP 85 40P

PERSONAL AUTHORS: Hoover,William G. ;

CONTRACT NO. F49620-81-C-0050, ARPA Order-4077

PROJECT NO. 2917

TASK NO. A3

MONITOR: AFOSR
TR-86-0300

UNCLASSIFIED REPORT

ABSTRACT: (U) Equations incorporating adiabatic, isothermal, and isoenergetic constraints are developed and applied to simulations of gases, liquids, and solids to obtained realistic fluid detonation wave profiles. The structure of uniaxially and hydrostatically compressed solids and the transfer of energy among translational and internal molecular modes are studied. Novel computational methods are developed simulating nonequilibrium processes using Guass' Principle of Least Constraint. Keywords: Detonation; Molecular Dynamics; Nonequilibrium Simulation; Hexanitrobenzene.

DESCRIPTORS: (U) *DETONATION WAVES, *MOLECULAR PROPERTIES, *FLUIDS, *HIGH EXPLOSIVES, COMPRESSION, DYNAMICS, ENERGY TRANSFER, EQUATIONS, FLUIDS, GASES, NONEQUILIBRIUM FLOW, NUMERICAL METHODS AND PROCEDURES, PROFILES, SIMULATION, SOLIDS, COMPUTERIZED SIMULATION, SHOCK WAVES, NITROGEN OXIDES, DEFORMATION, NITROBENZENES, CONTINUUM MECHANICS

IDENTIFIERS: (U) PE61102F, WUAFOSR2917A3

AD-A168 753

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 752 12/1

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Research in Adaptive and Decentralized Stochastic Control

DESCRIPTIVE NOTE: Final rept. 15 Mar 84-14 Nov 85,

JAN 86 9P

PERSONAL AUTHORS: Marcus,Steven I. ;

CONTRACT NO. AFOSR-84-0089

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR 86-0298

UNCLASSIFIED REPORT

ABSTRACT: (U) Significant progress was made in a number of aspects of stochastic systems. The problem of adaptive control of priority assignment in queueing systems was solved. A distance-measures approach to the problem of approximation and identification of queueing systems was studied. A problem of adaptively controlling a discounted-reward finite state Markov decision process was solved. Major new results were obtained for the problem of adaptive control with incomplete observations. In particular, the author studied in depth a problem of adaptive control with incomplete observations, in which the state is a finite state Markov process. In addition, earlier work on asymptotic approximations in non-linear filtering was completed. (Author)

DESCRIPTORS: (U) *ADAPTIVE CONTROL SYSTEMS, *STOCHASTIC CONTROL, APPROXIMATION(MATHEMATICS), ASYMPTOTIC SERIES, DECENTRALIZATION, FILTERS, IDENTIFICATION SYSTEMS, NONLINEAR SYSTEMS, QUEUEING THEORY, STOCHASTIC PROCESSES

IDENTIFIERS: (U) WUAFOSR2304A1, PE61102F

AD-A168 752

AD-A168 751 9/1 20/12

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCES

(U) Research on Materials and Components for Opto-Electronic Signal Processing.

DESCRIPTIVE NOTE: Interim rept. 1 Oct 84-30 Nov 85,

DEC 85 18P

PERSONAL AUTHORS: Chang,William S. ;Kellner,Albert L. ; Van Eck,Timothy ;Walpita,L. M. ;Wieder,H. H. ;

CONTRACT NO. AFOSR-84-0389

PROJECT NO. 2301

TASK NO. B1

MONITOR: AFOSR TR-86-0283

UNCLASSIFIED REPORT

ABSTRACT: (U) Electroabsorption and electrorefraction properties of heterostructures and multiple quantum-well structures in III-V semiconductors were investigated for spatial modulation and optical fibercommunication applications. Optical waveguides are fabricated and evaluated. A new device, the gate controlled photo diode (GCPD) has been conceived and demonstrated. It has potential applications in optical signal processing. Keywords: III-V Compound semiconductros; Electroabsorption; Electrorefraction; and Gated photo diode.

DESCRIPTORS: (U) *ELECTROOPTICS, *PHOTODIODES, *SEMICONDUCTORS, INDIUM PHOSPHIDES, GALLIUM ARSENIDES, REFRACTION, ALUMINUM GALLIUM ARSENIDE, FIBER OPTICS, CONTROL, GATES(CIRCUITS), GROUP III COMPOUNDS, GROUP V COMPOUNDS, OPTICAL PROCESSING, SIGNAL PROCESSING, MATERIALS, OPTICAL WAVEGUIDES, STRUCTURES, MODULATION, SPATIAL DISTRIBUTION

IDENTIFIERS: (U) Gated photodiodes, Electroabsorption, Electrorefraction, Quantum wells, MQW(Multiple Quantum Wells), Heterostructures, Gallium indium arsenides, WUAFOSR230581, PE61102F

AD-A168 751

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 748 20/11 13/13

NORTHWESTERN UNIV EVANSTON IL

(U) Impact Response of Structures--Global Local Approach.

DESCRIPTIVE NOTE: Interim rept. 1 Oct 83-30 Nov 84,

DEC 84. 81P

PERSONAL AUTHORS: Keer,Leon M. ;

CONTRACT NO. AFOSR-82-0330

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR
TR-86-0267

UNCLASSIFIED REPORT

ABSTRACT: (U) The response of an isotropic cantilever beam of finite length under the action of frictionless cylindrical and flat indenters is studied. Solutions are obtained through a local-global technique, which accounts for both the local behavior near the inderter, as well as the global beam behavior. The method of analysis superposes an infinite layer solution derived through the use of integral transforms with a pure bending beam theory solution. Local indenter stresses, as well as displacements and rotations are computed for each case and plotted for various ratios of contact width to beam length, and for various positions of the indenter. Where possible, the results are compared to Hertz theory of contact stresses and to beam displacement and rotation solutions. LOW VELOCITY IMPACT ON A CIRCULAR PLATE: An investigation was made on the low velocity impact on a circular plate by a rigid indenter. The plate response to impact shows some of but not all of the similar problem for a beam. The local contact stresses were developed from an elasticity theory, while the global stresses were obtained from plate theory.

DESCRIPTORS: (U) *STRESS STRAIN RELATIONS, *IMPULSE LOADING, *CANTILEVER BEAMS, STRESS ANALYSIS, METAL PLATES, CADMIUM, MAGNESIUM, LAMINATES, COMPOSITE MATERIALS, DISPLACEMENT, CYLINDRICAL BODIES, ELASTIC PROPERTIES, THEORY, GLOBAL, STRESSES, LAYERS, SOLUTIONS(GENERAL),

AD-A168 748 CONTINUED

ISOTROPISM, IMPACT, LOW VELOCITY, LENGTH, BEHAVIOR, RESPONSE, INTEGRAL TRANSFORMS, ROTATION

IDENTIFIERS: (U) Indentation, Indenters, WUAFOSR2302B1, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 745 5/10 8/18

CALIFORNIA UNIV IRVINE COLL OF MEDICINE

(U) Reinforcement Delay of One Second Severely Impairs Acquisition of Brain Self-Stimulation.

85 8P

PERSONAL AUTHORS: Black,Joel ;Belluzzi,James D. ;Stein, Larry ;

CONTRACT NO. F49620-81-K-0018

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR TR-86-0298

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Brain Research, v359 p113-119 1985.

ABSTRACT: (U) The effect of delayed reinforcement on the acquisition of lateral hypothalamic self-stimulation was investigated. Brain stimulation reinforcement minimizes cues associated with reinforcement delivery (secondary reinforcement) and, by eliminating consummatory responses, permits precise temporal control of the interval between the operant response and reinforcement. Different groups were trained in daily 1-h sessions for brain stimulation reinforcement at on of 4 delay intervals (1, 2, 3, or 6 s). Responses made during the delay interval were not reinforced and reset the delay timer. Control groups (IMMEDIATE) were reinforced immediately, but were required to space responses--according to a delayed reinforcement of low rates (DRL) schedule--for an interval corresponding to one of the delay of reinforcement intervals. The DRL schedule equalized opportunities for reinforcement and non-reinforcement. At all intervals, rats trained with delayed reinforcement had significantly lower bar-press rates than controls trained with immediate reinforcement under DRL. The results indicate that delays even as short as 1 s markedly impede the acquisition of self-stimulation behavior. Keywords: Reward and Learning

AD-A168 745

AD-A168 745 CONTINUED

DESCRIPTORS: (U) *STIMULATION(PHYSIOLOGY), *BEHAVIOR, *RESPONSE, *DELAY, CUES(STIMULI), NEUROLOGY, ACQUISITION, BRAIN, SIMULATION, CONTROL, GROUP DYNAMICS, LEARNING, RATS, DELIVERY, INTERVALS, TIMING DEVICES, LOW RATE, SECONDARY, REPRINTS

IDENTIFIERS: (U) Rewards, Reinforcement delay, WUAFOSR2312A1, PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 738 9/2 14/4

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

(U) Evaluations of Software Technologies: Testing, CLEANROOM, and Metrics.

DESCRIPTIVE NOTE: Technical rept.

MAY 85 195P

PERSONAL AUTHORS: Selby,Richard W. , Jr;

REPORT NO. TR-1500

CONTRACT NO. F49620-80-C-0001, NSG-5123

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR
TR 86-0278

UNCLASSIFIED REPORT

ABSTRACT: (U) A 7-step approach for quantitatively evaluating software technologies couples software methodology evaluation with software measurement. The approach is applied in-depth in (1) Software Testing Strategies: A 74-subject study, including 32 professional programmers and 42 advanced university students, compared code reading, functional testing, and structural testing in a fractional factorial design. (2) Cleanroom Software Development: Fifteen three-person teams separately built a 1200-line message system to compare Cleanroom software development (in which software is developed completely off-line) with a more traditional approach. (3) Characteristic Software Metric Sets: In the NASA S.E.L. production environment, a study of 65 candidate product and process measures of 652 modules from six (51,000 - 112,000 line) projects yielded a characteristic set of software complexity/quality metrics. The approach described for quantitatively evaluating software technologies was effective in a variety of problem domains. With the professionals, code reading detected more software faults and had a higher fault detection rate than did functional or structural testing. With the students, the 3 techniques were not noticeably different in the number of faults detected or in the fault detection rate. Code reading detected more interface faults and functional testing detected more control faults than did the other methods. Most developers using the Cleanroom software development approach were able to build systems completely off-line. The Cleanroom teams' products met system requirements more completely and succeeded on more operational test cases than did those developed with traditional approach.

DESCRIPTORS: (U) *COMPUTER PROGRAMS, *ERROR ANALYSIS, *COMPUTER PROGRAMMING, DETECTION, FACTORIAL DESIGN, FAULTS, INTERFACES, MEASUREMENT, OPERATIONAL EFFECTIVENESS, RATES, STUDENTS, TEAMS(PERSONNEL), TEST AND EVALUATION, TEST METHODS, STRUCTURAL ANALYSIS, PROGRAMMERS

IDENTIFIERS: (U) PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 728 9/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONIC SCIENCES LAB

(U) Joint Services Electronics Program - JSEP. Research in Electronics.

DESCRIPTIVE NOTE: Final rept. 1 Apr 81-31 Mar 85.

APR 86 171P

PERSONAL AUTHORS: Steier,William H. ;

CONTRACT NO. F49620-81-C-0070

PROJECT NO. 2305

TASK NO. A8

MONITOR: AFOSR
TR-86-0278

UNCLASSIFIED REPORT

ABSTRACT: (U) This final technical report summarizes accomplishments and progress of 10 work units (projects) for research performed during the reporting period under the Joint Services Electronics Program by the USC Electronic Sciences Laboratory. Keywords: Electronic materials; Semiconductors; Quantum electronics; Lasers; Communications; Signal processing; Computers; and Controls.

DESCRIPTORS: (U) *RESEARCH MANAGEMENT, COMPUTERS, ELECTRONIC EQUIPMENT, LABORATORIES, LASERS, MATERIALS, QUANTUM ELECTRONICS, SEMICONDUCTORS, SIGNAL PROCESSING, CONTROL SYSTEMS

IDENTIFIERS: (U) PE61102F

AD-A168 728

AD-A168 696 9/3

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) Continuous-Time Discrete-Order Lattice Filters.

DESCRIPTIVE NOTE: Rept. for 1984-1985.

APR 86 5P

PERSONAL AUTHORS: Lev-Ari,Hanoch ;

CONTRACT NO. N00014-85-K-0612, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0271

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in ICASSP Conference, 4p Apr 86.

ABSTRACT: (U) A recursive least squares (RLS) adaptive lattice algorithm for processing of continuous time signals is presented. It has the same structure as the discrete-time RLS lattice, namely a cascade of two input/two output sections with a single delay element per section. However, while the discrete-time scheme involves a fundamental unit of time (i.e., the sampling period of the signal), which determines both the duration of the delay and the rate of gain updating, our scheme involves a delay of arbitrary duration and continuously varying gains. The rate of parameter updating in the continuous time lattice configurations is essentially independent of the bandwidth and center frequency of the processed signal. Consequently, the gain-update module of the proposed algorithm can be implemented with slow devices (as with digital hardware) whereas the signalpath filter must match the frequency characteristics of the processed signal. Keywords: continuous time; discrete order; lattice filters; adaptive lattice filters; signal path filters; Reprints.

DESCRIPTORS: (U) *ADAPTIVE FILTERS, ALGORITHMS, BANDWIDTH, DISCRETE DISTRIBUTION, FREQUENCY, GAIN, INPUT, LATTICE DYNAMICS, LEAST SQUARES METHOD, OUTPUT, PARAMETERS, PATHS, RATES, RECURSIVE FUNCTIONS, REPRINTS.

AD-A168 696

AD-A168 696 CONTINUED

SAMPLING, SIGNALS, TIME, TIME SIGNALS, SIGNAL PROCESSING

IDENTIFIERS: (U) *Analog filters, PE61102F

AD-A168 691 7/4

NORTH TEXAS STATE UNIV DENTON CENTER FOR APPLIED QUANTUM ELECTRONICS

(U) Study of VUV Generation by Coherent Resonant Frequency Mixing in Metal Vapors.

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-31 Oct 84,

APR 86 51P

PERSONAL AUTHORS: Diels,Jean-Claude ;

CONTRACT NO. AFOSR-82-0332

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-86-0303

UNCLASSIFIED REPORT

ABSTRACT: (U) The properties of multiphoton resonances (two, four, or more) are exploited to enhance up frequency conversion rates. Simultaneously, the property of reversibility of coherent interaction is used to minimize the resonant losses (two-photon, four-photon absorption). A source of tunable, near bandwidth limited pulses, of more than a millijoule energy per pulse has been developed. A new scheme of computer controlled data acquisition made it possible to analyze, for the first time, the temporal coherence properties of the amplified pulses (at a rate of 20 pps). The method of interferometric autocorrelation has been applied to the study of multiphoton coherences, leading to the first measurement of the phase angle of the third order susceptibility. Experimental demonstration of coherent enhancement of harmonic generation was made. A conversion efficiency of 1% was achieved for third harmonic generation in lithium vapor, which is the maximum efficiency predicted by the theory for this system.

DESCRIPTORS: (U) *FREQUENCY CONVERSION, *THIRD HARMONIC GENERATION, *VACUUM ULTRAVIOLET RADIATION, *TWO PHOTON ABSORPTION, AUTOCORRELATION, BANDWIDTH, COHERENCE, COMPUTERS, CONTROL, DATA ACQUISITION, HARMONIC GENERATORS, INTERACTIONS, INTERFEROMETRY, LIMITATIONS, LITHIUM, METAL

AD-A168 696

AD-A168 691

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 891 CONTINUED

VAPORS, MIXING, OPTIMIZATION, PHOTONS, PULSE AMPLIFIERS, PULSES, RESONANCE, RESONANT FREQUENCY, RESONANCE ABSORPTION

IDENTIFIERS: (U) *Multiphoton absorption, Frequency mixing, PE61102F, WUAFOSR2301A1

AD-A168 891

AD-A168 885 9/3 20/6

OPTICAL SOCIETY OF AMERICA WASHINGTON D C

(U) Picosecond Electronics and Optoelectronics Held at Incline Village, Nevada on 13-15 March 1985.

DESCRIPTIVE NOTE: Final rept. 1 Feb 85-4 Feb 86,

FEB 86 138P

PERSONAL AUTHORS: Quinn,Jarus W. ;

CONTRACT NO. AFOSR-85-0105

PROJECT NO. 2305

TASK NO. B2

MONITOR: AFOSR TR-86-0157

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of the meeting was to provide a forum for people working in the different areas of ultrafast electronics and optoelectronics and sharing a common interest in the understanding and improvements of the electronic properties of semiconductors and superconductors, the physics of ultrafast devices, their applications and methods of measurements. (Author)

DESCRIPTORS: (U) *ELECTROOPTICS, *SEMICONDUCTOR LASERS, *SYMPOSIA, *QUANTUM ELECTRONICS, *PULSED LASERS, ELECTRONIC EQUIPMENT, ELECTRONICS, HIGH RATE, SEMICONDUCTORS, SUPERCONDUCTORS, GALLIUM ARSENIDES, PHOTOELECTRIC EMISSION, INDIUM PHOSPHIDES, TRANSPORT PROPERTIES, CHARGE CARRIERS, OPTICAL CIRCUITS, INTEGRATED CIRCUITS, MODE LOCKED LASERS

IDENTIFIERS: (U) Picosecond time, Aluminum gallium arsenide lasers, WUNR373115, PE61102F, WUAFOSR230582

AD-A168 885

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 671 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) DFR (Decreasing Failure Rate) Property of First Passage Times and Its Preservation under Geometric Compounding

DESCRIPTIVE NOTE: Technical rept.,

JAN 86 20P

PERSONAL AUTHORS: Shanthikumar,J. G. ;

CONTRACT NO. AFOSR-84-0208

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0278

UNCLASSIFIED REPORT

ABSTRACT: (U) It is shown that if the transition kernel of a discrete time Markov chain with state space (0,1,...) is totally positive of order two (TP2), the first passage time from state 1 to state 0 has decreasing failure rate (DFR). This result is used to show that (i) the sum of a geometric number (i.e., geometric compound) of i.i.d. DFR random variables is DFR and (ii) the number of customers served during a busy period in an M/G/1 queue with increasing failure rate service times is DFR. Recent results of Szekli (1986) and the closure property of i.i.d. DFR random variables under geometric compounding are combined to show that the stationary waiting time in a GI/G/1 (M/G/1) queue with DFR (increasing mean residual) service times is DFR. We also provide sufficient conditions on the inter-renewal times under which the renewal function is concave. These results shed some light on a conjecture of Brown (1981). (Author)

DESCRIPTORS: (U) *QUEUEING THEORY, DISCRETE DISTRIBUTION, FAILURE, GEOMETRY, MARKOV PROCESSES, RANDOM VARIABLES, RATES, TIME, TRANSITIONS, FUNCTIONS(MATHEMATICS), KERNEL FUNCTIONS

IDENTIFIERS: (U) WUAFOSR2304A5, PE61102F

AD-A168 671

AD-A168 648 20/2 7/4

CARNEGIE-MELLON UNIV PITTSBURGH PA MELLON INST OF SCIENCE

(U) Vapor Growth and Epitaxy/American Crystal Growth 1984: Proceedings of the Combined Meeting ICVGE/ACCG-6 Held in Atlantic City, NJ on 15-20 July 1984.

DESCRIPTIVE NOTE: Final rept. 1 Jul 84-30 Jun 85,

FEB 86 633P

PERSONAL AUTHORS: Schieber,M. ;Kaldis,E. ;Shaw,D. W. ; Stringfellow,G. B. ;Van Den Berg,L. ;

CONTRACT NO. AFOSR-84-0163

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR TR-86-0292

UNCLASSIFIED REPORT

Availability: Elsevier Science Publishing Co., 52 Vanderbilt Avenue, New York, NY 10017, HC $248.00. (No copies furnished by DTIC/NTIS).

ABSTRACT: (U) The American Association for Crystal Growth (AACG) held its Sixth American Conference on Crystal Growth (AACG-6) together wth the Sixth International Conference on Vapor Growth and Epitaxy (ICVGE-6) on July 15-20, 1984. Data presented at the Conference pertained to: Heat and mass transfer; Gravitational effects and characterization of crystals; Mechanisms of growth; Liquid phase epitaxy; Molecular beam epitaxy; Vapor phase epitaxy and chemical vapor deposition; Epitaxy with organometallic transport; Growth of large bulk crystals from vapor; Photovoltaics and solar cells; Heterostructures and characterization; Defects and characterization; Melt growth of oxides; Melt growth of semiconductors; Flux growth; Solution and hydrothermal growth; Industrial crystallization; Theory and Simulations; III-V compounds; Silicon and silicon compounds; II-VI and IV-VI compounds (for IR and X-ray detectors); Solar cells; Multilayer structures; Oxides; Alloys and Miscellaneous; and Characterization.

AD-A168 648

AD-A168 648 CONTINUED

DESCRIPTORS: (U) *INDUSTRIAL RESEARCH, *EPITAXIAL GROWTH, *SYMPOSIA, *CRYSTAL GROWTH, ALLOYS, CHEMICAL REACTIONS, VAPOR DEPOSIT[illegible], CRYSTALS, GRAVITY, GROUP III COMPOUNDS, GROUP V COMP[illegible]S, INTERNATIONAL, LIQUID PHASES, FLUX(RATE), S[illegible]TURES, CRYSTALLIZATION, BULK MATERIALS, MASS TRANSFER, [illegible]ELTS, LAYERS, STRUCTURES, OXIDES, SILICON, SOLAR CELLS, [illegible]R PHASES, MOLECULAR BEAMS, ORGANOMETALLIC [illegible]MPOUNDS, TRANSPORT, PHOTOVOLTAIC EFFECT, SILICON COMPO[illegible]S, VAPORS, DETECTORS, HEAT TRANSFER, X RAY APPARATUS

IDENTIFIERS: (U) PE61102F

AD-A168 642 8/8 8/3

BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

(U) Modeling Insect Dispersal and Estimating Parameters When Mark-Release Techniques May Cause Initial Disturbances.

88 20P

PERSONAL AUTHORS: Banks,H. T. ;Kareiva,P. M. ;Lamm,P. K. ;

CONTRACT NO. AFOSR-81-0198, NSF-MCS82-05335

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-86-0261

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Mathematical Biology, v22 p259-277 1985.

ABSTRACT: (U) We consider the problem of quantitatively modeling movements of marked flea beetles in cultivated arrays of the cole crop, collards (Brassica oleracese). Methods for the estimation of temporally and spatially dependent parameters in general dispersal models are outlined and a summary of our findings using these methods with flea beetle data is given.

DESCRIPTORS: (U) *VEGETATION, *ECOLOGY, *COLEOPTERA, MOTION, ESTIMATES, PARAMETERS, DISPERSING, INSECTS, MODELS, SIPHONAPTERA, REPRINTS

IDENTIFIERS: (U) PE61102F

OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 641 9/4

STANFORD UNIV CA DEPT OF ELECTRICAL ENGINEERING

(U) Adaptive Beamforming for Coherent Signals and Interference

DESCRIPTIVE NOTE: Rept. for 1984-1985.

JUN 86 11P

PERSONAL AUTHORS: Shan,Tie-Jun ;Kailath,Thomas ;

CONTRACT NO. DAAG29-81-K-0057, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86 0265

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing, vASSP-33 n3 p527-536 Jun 85.

ABSTRACT: (U) In this paper we introduce a new adaptive array beamformer able to work well even when the desired signal and the interference are coherent. The present adaptive beamformers fail to operate in these cases. The results of simulations support the theoretical predictions. Keywords include: Adaptive, Beam forming signals, Sensor elements, Receiver noise, Spatial dither, and Single snapshot.

DESCRIPTORS: (U) *RECEIVERS, *BEAM FORMING, *ARRAYS, *NOISE, *ADAPTIVE SYSTEMS, ALGORITHMS, SIGNAL PROCESSING, INTERFERENCE, ENERGY, COHERENCE, LINEAR SYSTEMS, DISTORTION, JAMMING, REPRINTS

IDENTIFIERS: (U) Spatial dither, Spectral estimation, Snapshots, Weighting vectors, Frost beamformers, PE61102F

AD-A168 627 9/3

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Mesh-Connected Processor Arrays for the Transitive Closure Problem.

DEC 85 7P

PERSONAL AUTHORS: Rao,Sailesh K. ;Citron,Todd ;Kailath, Thomas ;

CONTRACT NO. AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0264

UNCLASSIFIED REPORT

ABSTRACT: (U) The main purpose in this paper is to lay a theoretical foundation for the design of mesh connected processor arrays for the transitive closure program. Using a simple pathalgebraic formulation of the problem and observing its similarity to certain well known smoothing problems that occur digital signal processing, we show how to draw/upon existing techniques from the signal processing literature to derive regular iterative algorithms for determining the transitive closure of the graph. The regular iterative algorithms that are derived using this considerations, are then analyzed and synthesized on mesh-connected processor arrays. Among the vast number of mesh connected processor arrays that can be designed using this unified approach, the systolic arrays reported in the literature for this problem are shown to be special cases. Keywords: Mesh connected processor arrays; Transitive closure problems; Systolic architectures; Matrix multiplication; Array; and Iteration algorithm.

DESCRIPTORS: (U) *GRAPHS, *ARRAYS, ALGORITHMS, CLOSURES, DIGITAL SYSTEMS, ITERATIONS, SIGNAL PROCESSING, MESH

IDENTIFIERS: (U) Systolic arrays

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 824 20/8

POLYTECHNIC INST OF NEW YORK FARMINGDALE LONG ISLAND GRADUATE CENTER

(U) Millimeter Wave Generation by Relativistic Electron Beams.

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-30 Sep 85,

NOV 85 47P

PERSONAL AUTHORS: Kuo,Spencer S. ;Cheo,Bernard R. ;Tiong, K. K. ;Whang,M. H. ;

REPORT NO. POLY-85-011

CONTRACT NO. AFOSR-83-0001

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR TR-86-0306

UNCLASSIFIED REPORT

ABSTRACT: (U) The classical technique of transformation and characteristics is employed to analyze the problem of strong turbulence in unmagnetized plasmas. The effect of resonance broadening and perturnation expansion are treated simultaneously without time securities. The renormalization procedure is used in the transformed Vlasov equation to analyze the turbulence and to derive explicitly a diffusion equation. Analyses are extended to inhomogeneous plasma and the relationship between the transformation and ponderomotive force is obtained.

DESCRIPTORS: (U) *TURBULENCE, *PLASMAS(PHYSICS), EQUATIONS, ELECTRON BEAMS, RELATIVITY THEORY, MAGNETIZATION, DIFFUSION, MILLIMETER WAVES, WAVE PROPAGATION, PERTURBATIONS, PARTIAL DIFFERENTIAL EQUATIONS, TRANSFORMATIONS(MATHEMATICS), MASERS, HEATING, CYCLOTRON RESONANCE, GYROTRONS

IDENTIFIERS: (U) Vlason equations, Plasma instabilities, Vlasov equations, PE61102F, WUAFOSR2301A8

AD-A168 824

AD-A168 823 12/1

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) Impedance-Domain Levison Algorithms.

DESCRIPTIVE NOTE: Rept. for 1984-1985,

APR 86 8P

PERSONAL AUTHORS: Bistritz,Y. ;Lev-Ari,H. ;Kailath,T. ;

CONTRACT NO. AFOSR-83-0328

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0273

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in ICASSP Conference, Apr 86.

ABSTRACT: (U) Several computationally extra-efficient versions the Levinson algorithm are presented. The new versions require half the number of multiplications and the same number of additions as the conventional form of the Levinson algorithm. The saving is achieved by using three- (rather than two) term recursions and propagating them in an Impedance/Admittance domain rather than the conventional scattering domain. Our result apply both to Toeplitz and to close to Toeplitz systems. Moreover they provide a general method for reducing computational requirements in various recursive algorithm, e.g. adaptive least-square lattice algorithms. (Author)

DESCRIPTORS: (U) *ALGORITHMS, *RECURSIVE FUNCTIONS, COMPUTATIONS, REQUIREMENTS, SCATTERING, REPRINTS

IDENTIFIERS: (U) Levinson algorithm, PE61102F, WUAFOSR2304A5

AD-A168 823

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 822 22/2 12/1

STATE UNIV OF NEW YORK AT BUFFALO AMHERST DEPT OF MECHANICAL AND AEROSPACE ENGINEERING

(U) Qualitativ. Results for Distributed Systems with Discrete and Stiffness with Application to Control.

DESCRIPTIVE NOTE: Final rept. 1 Jul 82-30 Jun 85.

AUG 85 216P

PERSONAL AUTHORS: Inman,Daniel J. ;

CONTRACT NO. AFOSR-82-0242

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
TR-86-0286

UNCLASSIFIED R(ORT

ABSTRACT: (U) Distributed parameter models of large flexible space structures subject to various control techniques have been studied. The main thrust has been to develop qualitative results which are independent of truncation of discretization approaches by treating the fully distributed model. Emphasis has been on controlling the transcient response of non-conservative linear partial differential equation models of such structures subject to a few point actuators. Inequalities have been developed between the stiffness and damping operators which when satisfied guarantee that the response of a selfadjoint system will be uniformly exponentially stable. In addition, it has been shown that the inequalities insure that finite dimensional versions of the control problem converge to an optimal control of the fully distributed system subject to compact feedback as the number of modes in the finite model increases. The inequality developed constitues a generalization of the concept of underdamping normally used with single degree of freedom systems and provides a physical interpretation of the result.

DESCRIPTORS: (U) *SPACECRAFT, *FLEXIBLE STRUCTURES, *MATHEMATICAL MODELS, CONTROL, DAMPING, DISTRIBUTION, PARAMETERS, STIFFNESS

AD-A168 822

AD-A168 822 CONTINUED

IDENTIFIERS: (U) PE61102F, MUAFOSR2304A1

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 621 9/3

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) The Structure of Nonlinear Control Systems Possessing Symmetries.

MAR 85 12P

PERSONAL AUTHORS: Grizzle,Jessy W. ;Marcus,Steven I. ;

CONTRACT NO. AFOSR-84-0089

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR 86-0282

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. IEEE Transactions on Automatic Control, vAC-30 n3 p248-258 Mar 85.

ABSTRACT: (U) A concept of symmetry is defined for general nonlinear control systems. It is shown, under various technical conditions, that nonlinear control systems with symmetries admit local and/or global decompositions in terms of lower dimensional subsystems and feedback loops. The structure of the individual subsystems is dependent on the structure of the symmetry group; for example, if the symmetry group is Abelian, one of the subsystems is a quadrature. An additional feature of the decomposition is that the state-space dimensions of the subsystems sum to the state-space dimension of the original system. (Reprints)

DESCRIPTORS: (U) *CONTROL SYSTEMS, *NONLINEAR SYSTEMS, DECOMPOSITION, FEEDBACK, GLOBAL, LOCPS, REPRINTS, SIZES(DIMENSIONS), SYMMETRY, SYSTEMS ENGINEERING

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

AD-A168 621

AD-A168 618 7/5

OPTICAL SOCIETY OF AMERICA WASHINGTON D C

(U) Topical Meeting on Microphysics of Surfaces, Beams, and Adsorbates Held at Santa Fe, New Mexico on 4-6 February 1985.

DESCRIPTIVE NOTE: Final technical digest,

DEC 85 123P

PERSONAL AUTHORS: Quinn,Jarus W.

CONTRACT NO. AFOSR-85-0018

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR TR-86-0309

UNCLASSIFIED REPORT

ABSTRACT: (U) The Topical Meeting on Microphysics of Surfaces, Beams, and Adsorbates was organized within the interdisciplinary area of molecule/surface interactions induced, or studied, by laser and ion beam techniques. Especially emphasized was the molecular physics and electro magnetism of beam activated chemical reactions for applications in fabrication of semiconductor devices, in photocatalysis, and in optical recording. Emphasis was on the laser spectroscopy of molecular collision and reaction processes on surfaces, new sensitive or high resolution spectroscopies for studies of adsorbates, and optical methods applied to surface characterization.

DESCRIPTORS: (U) *PHOTOACTIVATION ANALYSIS, *PHOTOCHEMICAL REACTIONS, *LASER BEAMS, *PHOTOCHEMICAL REACTIONS, *ADSORBATES, LASER TARGET INTERACTIONS, SYMPOSIA, PARTICLE COLLISIONS, MOLECULAR BEAMS, SURFACE CHEMISTRY, ETCHING, ION BOMBARDMENT, LASER INDUCED FLUORESCENCE, RAMAN SPECTRA, EPITAXIAL GROWTH, VAPOR DEPOSITION, HIGH RESOLUTION, SPECTROSCOPY, LASERS, SURFACES, MOLECULAR STRUCTURE, RESOLUTION, CATALYSIS, FABRICATION, SEMICONDUCTOR DEVICES, ION BEAMS, INTERACTIONS, OPTICAL PROPERTIES, RECORDING SYSTEMS

IDENTIFIERS: (U) Photoacoustic spectroscopy, Raman

AD-A168 618

AD-A168 618 CONTINUED

spectroscopy. PE61102F. WUAFOSR2303A2

AD-A168 617 12/1

INDIANA UNIV AT BLOOMINGTON DEPT OF COMPUTER SCIENCE

(U) Probabilistic Analysis of Algorithms for NP-Complete Problems.

DESCRIPTIVE NOTE: Annual scientific rept. (Final) 30 Sep 84-29 Sep 85.

DEC 85 8P

PERSONAL AUTHORS: Franco,John ;

CONTRACT NO. AFOSR-84-0372

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR TR-86-0310

UNCLASSIFIED REPORT

ABSTRACT: (U) The goal of this research is to develop and analyze algorithms which can, in some practical sense, solve certain NP-complete problems efficiently. By solve we mean determine whether a solution to a given instance of an NP-complete problem exists where, for the problems we have considered, a solution is an assignment of values to a list of variables which cause some predicate to be true. We do not consider actually finding solutions when they exist since doing so adds unnecessary complexity to the statement of the algorithms: the algorithms we consider can all be modified to find solutions without significantly altering performance. NP-complete problems are found in Crytology, Operations Research, Artificial Intelligence, Computer System Design and many other areas. There is no known algorithm for an NP-complete problem which runs in time bounded by a polynomial on the length of the input (polynomial time) in the worst case nor is one likely to be found. We seek algorithms which solve nearly every instance of specific NP-complete problems in polynomial time.

DESCRIPTORS: (U) *ALGORITHMS, *PROBABILITY, ARTIFICIAL INTELLIGENCE, OPERATIONS RESEARCH, POLYNOMIALS, SOLUTIONS(GENERAL), TIME, VARIABLES, PROBLEM SOLVING

AD-A168 618

AD-A168 617

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 617 CONTINUED

IDENTIFIERS: (U) NP complete problems, PE61102F, WUAFOSR2304A2

AD-A168 615 12/1

RUTGERS - THE STATE UNIV NEW BRUNSWICK N J

(U) Analysis and Regulation of Nonlinear and Generalized Linear Systems.

DESCRIPTIVE NOTE: Final technical rept. 15 Jun 80-14 Jul 85,

SEP 85 12P

PERSONAL AUTHORS: Sontag,Eduardo D. ;

CONTRACT NO. AFOSR-80-0198

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR TR-86-0285

UNCLASSIFIED REPORT

ABSTRACT: (U) Applications are described of various mathematical techniques to problems of regulation and control of nonlinear sampled-data systems and of systems over rings, including delay-differential systems and families of linear systems. An extensive bibliography of papers published is included. Keywords: Mathematical models. (Author)

DESCRIPTORS: (U) *LINEAR SYSTEMS, *NONLINEAR SYSTEMS, MATHEMATICAL ANALYSIS, MATHEMATICAL MODELS, RINGS, SAMPLING, NONLINEAR ANALYSIS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 614 5/10 8/15 8/16

CALIFORNIA UNIV IRVINE DEPT OF PHARMACOLOGY

(U) Neuronal Mechanisms of Intelligence.

DESCRIPTIVE NOTE: Annual scientific rept. 1 Sep 84-31 Aug 85,

MAR 86 14P

PERSONAL AUTHORS: Stein,Larry ;Belluzzi,James D. ;

CONTRACT NO. AFOSR-84-0328

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR
TR-86-0022B7

UNCLASSIFIED REPORT

ABSTRACT: (U) The underlying premise of this research is that the neuron itself is the functional unit in the brain for positive reinforcement. Our early studies demonstrated for the first time that the firing rate of a brain cell could be increased by local applications of reinforcing transmitters of drugs. Our current work has two aims: 1) to examine the detailed anatomical and pharmacological properties of such cellular operant conditioning, and 2) to compare these properties with those of behavioral operant conditioning in order to determine important similarities and differences. We have studied cellular operant conditioning in whole-brain and brain-slice experiments. In whole brain, we have attempted to identify those cells most susceptible to reinforcement using electrical stimulation of rewarding brain sites as reinforcement. In brain slice experiments, we have found that 1) the reinforcing action of dopamine is likely mediated at D2 dopamine receptors, and 2) cellular operant conditioning is possible using locally applied electrical stimulation as reinforcement. At the behavioral level we have continued our pharmacological characterization of reinforcement receptors in self-stimulation of hippocampus and nucleus accumbens (primary sites of the brain slice experiments), and characterization of reinforcement receptors in place preference studies (an alternative method to self-

AD-A168 614

AD-A168 614 CONTINUED

stimulation for measuring reward). Keywords: Neuronal conditioning; Positive reinforcement; Learning; and Adaptive networks.

DESCRIPTORS: (U) *BRAIN, *DRUGS, *NERVE CELLS, *INTELLIGENCE, *CONDITIONING(LEARNING), ADAPTIVE SYSTEMS, ANATOMY, CELLS, DOPAMINE, ELECTRIC CURRENT, FIRING RATES, LEARNING, NETWORKS, PHARMACOLOGY, SITES, NERVE TRANSMISSION, STIMULATION(PHYSIOLOGY), HIPPOCAMPUS

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A1

AD-A168 614

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 613 5/10 6/16

OREGON UNIV EUGENE

(U) Visual Representations Subserving Texture Perception.

DESCRIPTIVE NOTE: Final rept. 1 Apr 83-31 Aug 85,

JAN 88 108P

PERSONAL AUTHORS: Beck,Jacob ;Stevens,Kent A. ;

CONTRACT NO. F49620-83-C-0083

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR
TR-86 0290

UNCLASSIFIED REPORT

ABSTRACT: (U) We have conducted research on the role of spatial filtering, features, and grouping in texture segregation. Our experiments indicate the interplay of two different processes. One process involves the differential excitation of elongated receptive fields. Texture segregation is a function of energy differences (contrast and size) that are largely extracted from the lower spatial frequencies. The second process involves local processes of linking between localized features. Linking of contours, for example, is a function of contour smoothness, collinearity, orientation, etc. These affects cannot be explained in terms of low frequency differences. Studies of the linking of discrete textures have provided convergent evidence for explicit place markers and the role of similarity of attributes such as color and contrast in establishing these groupings. We have also examined the role of pairwise linkings, or virtual lines for imposing global organization on the localized intensity changes. Also, at the level of contour representation within texture, we have shown the role of the concave cusp, a localized geometric feature, in determining figure-ground assignment in texture. Keywords: Vision; Texture perception, and Texture segmentation.

DESCRIPTORS: (U) *TEXTURE, *VISUAL PERCEPTION, CONCAVE BODIES, CONTOURS, CONVERGENCE, ENERGY, EXCITATION, GLOBAL,

AD-A168 613

AD-A168 613 CONTINUED

LOW FREQUENCIES, LOW FREQUENCY, MARKERS, ORGANIZATIONS, SPATIAL DISTRIBUTION, SPATIAL FILTERING, VISION, COLORS, CONTRAST

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A5

AD-A168 613

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 610 7/4 11/8

MASSACHUSETTS UNIV AMHERST DEPT OF POLYMER SCIENCE AND ENGINEERING

(U) Spectroscopic Analysis of Poly(p-phenylene benzobisthiazole) Films.

86 12P

PERSONAL AUTHORS: Chang,Chih ;Hsu,S. L. ;

CONTRACT NO. F33615-78-C-5178, AFOSR-85-0278

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR 86-0250

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Polymer Science: Polymer Phys. Edition, v23 p2307-2317 1985.

ABSTRACT: (U) Infrared spectroscopy has been used to determine the relative amount, location, and orientation of residual water and acid molecules in poly(p-phenylene benzobisthiazole) films. By analyzing the relative absorbance of reflected polarized infrared radiation from highly oriented films, the indices of refraction parallel and perpendicular to the chain axis were also obtained. The presence of residual acid and water in the postprocessing sample is of obvious interest, not only because it influences the perfection of chain packing and interacts with the matrix material used for composites, but because it may also initiate unexpected chemical reactions with the polymer during postprocessing thermal treatment, consequently leading to crosslinking or degradation. The principal aim of this spectroscopic analysis is to measure the amount and the environment of residual acid and water molecules in these processed samples. Infrared spectroscopy provides a convenient and effective method to determine the concentration of acid or water in a sample.

DESCRIPTORS: (U) *INFRARED SPECTROSCOPY, *POLYMERIC FILMS, *POLYPHENYLENES, *THIAZOLES, ACIDS, MOLECULES, CHAINS, PACKAGING, DEGRADATION, ORIENTATION(DIRECTION), RESIDUALS, WATER, HEAT TREATMENT, PROCESSING, AXES, CHAINS, CHEMICAL REACTIONS, ENVIRONMENTS, RESIDUALS, MATRIX MATERIALS, FILMS, INFRARED RADIATION, POLARIZATION, REFLECTION, MOLECULAR STRUCTURE, CROSSLINKING(CHEMISTRY), REFRACTION, SPECTROSCOPY, MOLECULES, REPRINTS

IDENTIFIERS: (U) Thiazole/Polyphenylene Benzobis, PE61102F, WUAFOSR2303A3

AD-A168 610

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 592 7/4 7/5

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) State-Resolved Reaction Dynamics.

DESCRIPTIVE NOTE: Final rept. 1 Nov 84-31 Oct 85,

DEC 85 8P

PERSONAL AUTHORS: Zare,Richard N. ;

CONTRACT NO. F49620-85-C-0021

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR 86-0307

UNCLASSIFIED REPORT

ABSTRACT: (U) During the past three years major progress has been made in three areas: (1) the study of the simplest of all neutral bimolecular reactions H + D2 yields HD + D using one laser to generate fast H atoms in the photolysis of HI in an HI + D2 mixture and a second laser to detect the HD product in a quantum state specific manner by resonance-enhanced multiphoton ionization of Hd via the E,F I sigma g + state; (2) The determination of the distribution of impact parameters responsible for the formation of BaI(v=8) product in the beam-gas reaction Ba + HI. This required a full rotational analysis of the BaI sq X sigma + and sq C pi states; (3) the commencement of studies on ion-molecule reactions in which the reagent ion's vibrational and translation energy is controlled and varied in a systematic manner.

DESCRIPTORS: (U) *REACTION KINETICS, *HYDROGEN IODIDE, *MOLECULAR STATES, *PHOTOLYSIS, DEUTERIUM, PHOTOIONIZATION, VIBRATION, ROTATION, LASERS, QUANTUM THEORY, CHEMICAL REACTIONS, IONS, MOLECULES, IMPACT, PARAMETERS

IDENTIFIERS: (U) Ion molecule interactions, PE61102F, WUAFOSR230381

AD-A168 592

AD-A168 576 11/4

IDAHO UNIV MOSCOW DEPT OF MECHANICAL ENGINEERING

(U) Improvement and Optimization of Internal Damping in Fiber Reinforced Composite Materials.

DESCRIPTIVE NOTE: Final rept. Jun 83-Nov 85,

MAR 86 225P

PERSONAL AUTHORS: Gibson,R. F. ;Suarez,S. A. ;

CONTRACT NO. AFOSR-83-0158

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR
TR-86-0330

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this research were to study the effects of such parameters as fiber aspect ratio, fiber orientation and fiber/matrix properties on damping in fiber reinforced polymer composites. These objectives were to be met by using both experimental and analytical approaches. The development of improved techniques for fabrication and testing of specimens and the development of relatively simple design equations for prediction of damping were desirable goals which were also met. Two new computer-aided testing techniques based on the impulse frequency response approach were developed. Specimens of graphite/epoxy, boron/epoxy and Kevlar aramid/epoxy were fabricated by using an autoclave-style press cure which was developed specifically for this program. Although a number of parameters were studied, the emphasis was on the influence of fiber length, fiber orientation and fiber material on damping of polymer composites. The experimental results show that, as predicted, very low fiber aspect ratios are required to produce significant improvements in damping. Of the three fiber types tested, the Kevlar aramid fiber composite was found to have much better damping than graphite or boron fiber composites. Measurements and predictions also indicate that the control of fiber orientation in a continuous fiber reinforced laminate may be a better approach to the improvement of damping than the control

AD-A168 576

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 576 CONTINUED

of fiber aspect ratio.

DESCRIPTORS (U) •DAMPING, •FIBER REINFORCED COMPOSITES, •FIBERS, BORON, FIBER REINFORCEMENT, ORIENTATION(DIRECTION), CONTROL, ASPECT RATIO, MATERIALS, COMPOSITE MATERIALS, POLYMERS, LENGTH, PREDICTIONS, INTERNAL, EQUATIONS, GRAPHITE, PARAMETERS, APPROACH, RESPONSE

IDENTIFIERS (U) PE61102F

AD-A168 576

AD-A168 568 5/9 5/10 6/2 12/1

PERCEPTRONICS INC WOODLAND HILLS CA

(U) Operator Alertness/Workload Assessment Using Stochastic Model-Based Analysis of Myoelectric Signals.

DESCRIPTIVE NOTE: Interim rept. Apr 83-Oct 85 on Phase 2,

NOV 85 83P

PERSONAL AUTHORS: Madni,Azad ;Conaway,Carla ;Otsubu, Shirley ;Chu,Yee-Yeen ;Purcell,Denis ;

REPORT NO. PIR-1128-85-4

CONTRACT NO. F49620-83-C-0001

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR TR-86-0317

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the activities in the second phase of a three-year program of research and development directed toward the analysis and evaluation of myoelectric signals (MES) as indicators of operator alertness, and potentially workload in aircraft piloting tasks. The purpose of the study is to investigate the efficiency of stochastic models such as autoregressive (AR), autoregressive-moving-average (ARMA) and autoregressive integrated moving average (ARIMA) models in characterizing the MES under different levels of task imposed burden. The specific objectives of this effort are: (1) to develop/adapt state-of-the-art stochastic models for characterizing myoelectric signal patterns; (2) To investigate under controlled experimental conditions if meaningful repeatable quantitative relationships can be identified between MES patterns and operator loading; (3) To experimentally identify muscle sites that provide reliable MES signatures; (4) To develop methods and procedures for tuning the models and possibly filtering out pattern variations due to variables in electrode locations and individual biases; and (5) To develop guidelines for automatically assessing operator alertness level from the MES temporal signature in piloting tasks.

AD-A168 568

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 568 CONTINUED

(Author)

DESCRIPTORS: (U) *OPERATORS(PERSONNEL), *WORKLOAD, *PERFORMANCE(H[illegible]), *PILOTS, *ELECTROMYOGRAPHY, *MONITORING, A[illegible]FT, ATTENTION, EFFICIENCY, ELECTRODES, INDICATORS, MA[illegible]ATICAL MODELS, MUSCLES, POSITION(LOCAT[illegible] QUANTITATIVE ANALYSIS, REPRODUCIBILITY [illegible]ITES, STOCHASTIC PROCESSES, TUNING, WORK MEASUREME[illegible] REGRESSION ANALYSIS, PATTERN RECOGNITION, S[illegible]AL PROCESSING

IDENTIFIERS: (U) Alertness, MES(MyoElectric Signals), ARMA(AutoRegressive Moving Average), ARIMA(AutoRegressive Integrated Moving Average), PE61102F, WUAFOSR2313A4

AD-A168 568

AD-A168 567 5/8 5/10 8/2 12/1

PERCEPTRONICS INC WOODLAND HILLS CA

(U) Operator Alertness/Workload Assessment Using Stochastic Model-Based Analysis of Myoelectric Signals.

DESCRIPTIVE NOTE: Final rept. Apr 84-Oct 86,

NOV 86 130P

PERSONAL AUTHORS: Madni,Azad ;Conawcy,Carla ;Otsubu, Shirley ;Chu,Yee-Yeen ;

REPORT NO. PFTR-1126-86-11

CONTRACT NO. F49620-83-C-0001

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR TR-86-0328

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the research conducted in the second phase of this three-year research and development program directed toward the analysis and evaluation of myoelectric signals (MES) is indicators of operator alertness and piloting workload. The purpose of the study was to investigate the efficiency of stochastic models such as autoregressive (AR), autoregressive-moving-average (ARMA), and autoregressive integrated moving average (ARIMA) models in characterizing the MES under different levels of task-imposed burden. The implications from this three-year research program are two-fold. Surface myoelectric activity is not a reliable measure of operator alertness. During Phase I, the first autoregressive coefficient of the ARIMA model revealed a significant correlation with task difficulty level. During Phase III, the pi weights did not show the same trend. Intramuscular electrodes, on the other hand, that do pick up more reliable signatures have obvious drawbacks. Post hoc analysis of the experimental data revealed that the total number of experimental subjects which were constrained by program scope and size were inadequate in terms of producing a statistically significant difference in perceived stress between the

AD-A168 567

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 567 CONTINUED

single and dual-task groups.

DESCRIPTORS: (U) *OPERATORS(PERSONNEL), *PILOTS, *WORKLOAD, *PERFORMANCE(HUMAN), *ELECTROMYOGRAPHY, *MONITORING, ATTENTION, COEFFICIENTS, EFFICIENCY, ELECTRODES, INDICATORS, MATHEMATICAL MODELS, MUSCLES, REGRESSION ANALYSIS, PATTERN RECOGNITION, RELIABILITY, SIGNATURES, STOCHASTIC PROCESSES, WORK MEASUREMENT, SIGNAL PROCESSING

IDENTIFIERS: (U) Alertness, MES(MyoElectric Signals), Arma(AutoRegressive Moving Average), ARIMA(AutoRegressive Integrated Moving Average), PE61102F, WUAFOSR2313A4

AD-A168 567

AD-A168 561 9/3

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF AERONAUTICS AND ASTRONAUTICS

(U) Approximate Evaluation of Reliability and Availability Via Perturbation Analysis.

DESCRIPTIVE NOTE: Annual progress rept. 1 Jun 84-31 May 85.

SEP 85 45P

PERSONAL AUTHOR: Walker,Bruce K. ;Chu,Siu-Kwong ;Wereley, Norman M. ;

CONTRACT NO. AFOSR-84-0160

PROJECT NO. 2304

TASK NO. K3

MONITOR: AFOSR TR-85-0314

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: (U) Progress is described on a project whose goal is the development of practical tools for evaluating the reliability and availability of fault-tolerant control or sensor systems. The approach relies on the generation of a Markovian model for the behavior of the system in terms of failures and Redundancy Management decisions. The project entails the investigation of approximate techniques for deriving results from these models. The basic idea is that the time-behavior of the model decomposes into two time scales where the results of interest occur in time frames intermediate to the two time scales. By modifying previous theory, an approximate evaluation scheme is developed and shown to be valid for a number of example cases. Ongoing work is also described. (Author)

DESCRIPTORS: (U) *FAULT TOLERANT COMPUTING, *CONTROL SYSTEMS, *SYSTEMS ANALYSIS, DECISION MAKING, DETECTORS, MANAGEMENT, MARKOV PROCESSES, PERTURBATIONS, REDUNDANCY, RELIABILITY, SCALE, TEST AND EVALUATION, TIME, TIME INTERVALS, MATHEMATICAL MODELS

AD-A168 561

AD-A188 861 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2304K3

AD-A188 548 7/1

VANDERBILT UNIV NASHVILLE TN DEPT OF CHEMISTRY

(U) Potentials for Weakly Bound States in I2 from Diffuse Spectra and Predissociation Data,

MAY 85 6P

PERSONAL AUTHORS: Tellinghuisen,Joel ;

CONTRACT NO. AFOSR-83-0110

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
TR-86-0214

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v82 n9 p4012-4016, 1 May 85.

ABSTRACT: (U) Potential curves are derived for the 2431 1 Pi sub u and 2341 1 sub g 3 Pi states of I2 using existing data from several sources. Compared with previous estimates, the new potentials are thought to be valid over a wider range of internuclear distance, spanning the shallow bound wells at large R (>4A) and the repulsive regions where they cross the well-known B(0(+) sub u 3 Pi) state at small R (<3.3A). Seven of the ten Hund's case (c) molecular states which correlate with ground-state I atoms are now known experimentally, including three which cross the B state. The role of these states in the collisional quenching of B and in the geminate recombination of I atoms is considered. Keywords: Diffuse spectra predissocation; Internuclear collisional quenching; Reprints; Iodine.

DESCRIPTORS: (U) *QUENCHING, *IODINE, *RECOMBINATION REACTIONS, *IONS, DIFFUSION, GROUND STATE, MOLECULAR STATES, REPRINTS, COLLISIONS, PHOTODISSOCIATION, EMISSION SPECTRA, ELECTRONIC STATES

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1

AD-A188 544 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Estimating Jointly System and Component Reliabilities Using a Mutual Censorship Approach.

DESCRIPTIVE NOTE: Technical rept.,

FEB 88 35P

PERSONAL AUTHORS: Doss,Hani ;Freitag,Steven ;Proschan, Frank ;

REPORT NO FSU-STATISTICS-M717, TR-88-188-AFOSR

CONTRACT NO F49620-88-C-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0334

UNCLASSIFIED REPORT

ABSTRACT: (U) Let F denote the life distribution of a coherent structure of independent components. Suppose that we have a sample of independent systems, each having the structure phi. Each system is continuously observed until it fails. For every component in each system, either a failure time or a censoring time is recorded. A failure time is recorded if the component fails before or at the time of system failure; otherwise a censoring time is recorded. We introduce a method for finding estimates for F(t) quantiles, and other functionals of F, based on the censorship of the component lives by system failure. We present limit theorems that enable the construction of confidence intervals for large samples. (Author)

DESCRIPTORS (U) *ESTIMATES, *STATISTICAL ANALYSIS, CENSORSHIP, COHERENCE, CONFIDENCE LIMITS, FAILURE, INTERVALS, SAMPLING, TIME

IDENTIFIERS (U) Kaplan Meier estimator, PE61102F, WUAFOSR2304A5

AD-A188 544

AD-A188 533 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Conditional Scores and Optimal Scores for Generalized Linear Measurement-Error Models.

DESCRIPTIVE NOTE: Technical rept. Aug 85-Aug 88,

OCT 88 28P

PERSONAL AUTHORS: Stefanski,Leonard A. ;Carroll,Raymond J. ;

REPORT NO. MIMEO-SER-1885

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0319

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper studies estimation of the parameters of generalized linear models in canonical form when the explanatory vector is measured with independent normal error. For the functional case, i.e., when the explanatory vectors are fixed constants, unbiased score functions are obtained by conditioning on certain sufficient statistics. This work generalizes results obtained for logistic regression. In the case that the explanatory vectors are independent and identically distributed with unknown distribtuion, efficient score functions are obtained using the theory developed in Begun et al. (1983). Keywords: Conditional score function; Efficient score function; Functional model; Generalized linear model; Measurement error; Structural model.

DESCRIPTORS: (U) *SCORING, *ERROR ANALYSIS, CONSTANTS, ERRORS, ESTIMATES, LINEAR SYSTEMS, LINEARITY, MATHEMATICAL MODELS, MEASUREMENT, OPTIMIZATION, REGRESSION ANALYSIS, FUNCTIONAL ANALYSIS, COVARIANCE

IDENTIFIERS: (U) Canonical forms, Maximum likelihood estimation, PE61102F

AD-A188 533

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 532 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) M-Estimation for Discrete Data: Asymptotic Distribution Theory and Implications.

DESCRIPTIVE NOTE: Technical rept. Aug 85-Aug 86,

NOV 86 23P

PERSONAL AUTHORS: Simpson,Douglas G. ;Carroll,Raymond J. ; Ruppert,David ;

REPORT NO. MIMEO-SER-1686

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-88-0320

UNCLASSIFIED REPORT

ABSTRACT: (U) The asymptotic distribution of an M-estimator is studied when the underlying distribution is discrete. Asymptotic normality is shown to hold quite generally within the assumed parametric family. When the specification of the model is inexact, however, it is demonstrated that an M-estimator with a non-smooth score function, e.g. a Huber estimator, has a non-normal limiting distribution at certain distributions, resulting in unstable inference in the neighborhood of such distributions. Consequently, smooth score functions are proposed for discrete data. Keywords: Robust estimation; M estimator; Discrete parametric model; Smooth score function.

DESCRIPTORS: (U) *ASYMPTOTIC NORMALITY, *PROBABILITY DISTRIBUTION FUNCTIONS, ABNORMALITIES, ASYMPTOTIC SERIES, DISTRIBUTION ESTIMATES, LIMITATIONS, MATHEMATICAL MODELS, PARAMETRIC ANALYSIS, SCORING, DISCRETE DISTRIBUTION

IDENTIFIERS: (U) M estimates, Robust procedures, Smoothing

AD-A168 532

AD-A168 531 9/2

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

(U) R-Trees: A Dynamic Index Structure for Spatial Searching.

DESCRIPTIVE NOTE: Interim rept.,

OCT 83 32P

PERSONAL AUTHORS: Guttman,Antonin ;Stonebraker,Michael ;

REPORT NO. UCB/ERL-M83/64

CONTRACT NO. AFOSR-83-0254, NSF-ECS83-00463

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR TR-86-0337

UNCLASSIFIED REPORT

ABSTRACT: (U) Spatial data objects often cover areas in multi-dimensional spaces and are not well represented by point locations. For example, map objects like countries, census tracts etc. occupy regions of non-zero size in two dimensions. A common operation on spatial data is to search for all objects in an area. An example would be to find all the countries that have land within 20 miles of a particular point. This kind of spatial search occurs frequently in computer aided design (CAD) and geo-data applications. In such applications it is important to be able to retrieve objects efficiently according to their spatial location. A number of structures have been proposed for handling multi-dimensional point data, and a survey of methods can be found. Cell methods are not good for dynamic structures because the cell boundaries must be decided in advance. Quad trees and k-d trees do not take paging of secondary memory into account. K-D-B trees are designed for paged memory but are only useful for point data. The use of index intervals has been suggested but this method cannot be used on multiple dimensions. Corner stitching is an example of a structure for two-dimensional spatial searching suitable for data objects of non zero size, but is assumes homogeneous primary memory and is not efficient for random searches in very

AD-A168 531

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 531 CONTINUED

large collections of data. Grid files handle non-point data by mapping each object to a point in a higher-dimensional space. This paper describes an alternative structure called an R-tree which represents data objects by intervals in several dimensions.

DESCRIPTORS: (U) *ALGORITHMS, *SEARCHING, BOUNDARIES, COLLECTION, COMPUTER AIDED DESIGN, DYNAMICS, INDEXES, INTERVALS, MEMORY DEVICES, OPERATION, PAGING, POSITION(LOCATION), REGIONS, SECONDARY, TREES, TWO DIMENSIONAL

IDENTIFIERS: (U) PE61102F

AD-A168 531

AD-A168 530 9/2

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

(U) Implementation Techniques for Main Memory Database Systems.

DESCRIPTIVE NOTE: Interim rept.,

JAN 84 24P

PERSONAL AUTHORS: DeWitt,David J. ;Katz,Randy H. ;Olken, Frank ;Shapiro,Leonard D. ;Stonebraker,Michael R. ;

REPORT NO. UCB/ERL-84/5

CONTRACT NO. AFOSR-83-0254, NSF-MCS82-01860

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR TR-86-0338

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by grants, NSF-MCS82-01870, DE-AC02-81ER10920, and W 7405-ENG-48.

ABSTRACT: (U) With the availability of very large, relatively inexpensive main memories, it is becoming possible to keep large databases resident in main memory. This paper considers the changes necessary to permit a relational database system to take advantage of large amounts of main memory. The authors evaluate AVL vs. B+- tree access methods for main memory databases, hash-based query processing strategies vs. sort-merge, and study recovery issues when most or all of the database fits in main memory. As expected, B+- trees are the preferred storage mechanism unless more than 80-90% of the database fits in main memory. A somewhat surprising result is that hash based query processing strategies are advantageous for large memory situations. Keywords: Access; Algorithms. (Author)

DESCRIPTORS: (U) *DATA STORAGE SYSTEMS, ALGORITHMS, DATA BASES, MEMORY DEVICES, TREES

IDENTIFIERS: (U) Relational data bases, PE61102F

AD-A168 530

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 528 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) Bounds for the System Reliability Functi

DESCRIPTIVE NOTE: Technical rept.,

MAY 85 14P

PERSONAL AUTHORS: Shanthikumar,J. G. ;

CONTRACT NO. AFOSR-84-0205

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0335

UNCLASSIFIED REPORT

ABSTRACT: (U) A coherent system with independent non-renewable components with arbitrary lifetime distributions is considered. A simple observation leads to a hierarchy of upper and lower bounds that converge to the exact system reliability. The simplest of these bounds is shown to be tighter than the bounds of Gertsbakh (1985). (Author)

DESCRIPTORS: (U) *DISTRIBUTION FUNCTIONS, COHERENCE, HIERARCHIES, RELIABILITY

IDENTIFIERS: (U) Upper bounds, Lower bounds, Lifetime distributions, PE61102F

AD-A168 527 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) On Stochastic Comparison of Random Vectors.

DESCRIPTIVE NOTE: Technical rept.,

APR 85 24P

PERSONAL AUTHORS: Shanthikumar,J. G. ;

CONTRACT NO. AFOSR-84-0205

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
TR-86-0333

UNCLASSIFIED REPORT

ABSTRACT: (U) This document provides sufficient conditions under which two random vectors could be stochastically compared using the standard construction. These conditions are weaker than those discussed by Arjas and Lehtonen and Veinott. Using these conditions the authors present extensions of a result of Block, Bueno, Savits and Shaked concerning the stochastic monotonicity of independent and identically distributed random variables conditioned on their partial order statistics, and a theorem of Efron regarding an increasing property of Polya frequency functions. Applications of these extensions are also pointed out. (Author)

DESCRIPTORS: (U) *VECTOR ANALYSIS, COMPARISON, DISTRIBUTION, FREQUENCY, ORDER STATISTICS, RANDOM VARIABLES, STOCHASTIC PROCESSES, FUNCTIONS(MATHEMATICS)

IDENTIFIERS: (U) PE61102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 526 9/3 12/1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

(U) First Failure Time of Dependent Parallel Systems with Safety Periods.

DESCRIPTIVE NOTE: Technical rept.,

FEB 85 27P

PERSONAL AUTHORS: Shanthikumar,J. G. ;

CONTRACT NO. AFOSR-84-0208

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0332

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper considers the time to first failure of a parallel system in which the failure and repair rates of components depend on the state of the other components as well. A back-up unit with a random life time is employed whenever all the components of the system are down. The system fails when all the components of the system and the back-up unit are down. The first moment, the Laplace transform and the probability distribution of the time to first failure of this system are obtained. Sufficient conditions under which this distribution has the new better than used (NBU) and an exponential limit property are given. Special cases with phase type and deterministic back-up unit lifetimes are also considered. These results extend the results of Ross and Schechtman (1979). (Author)

DESCRIPTORS: (U) *SYSTEMS ANALYSIS, *APPLIED MATHEMATICS, BACKUP SYSTEMS, DETERMINANTS(MATHEMATICS), FAILURE, LAPLACE TRANSFORMATION, MOMENTS, PARALLEL ORIENTATION, PARTS, PROBABILITY DISTRIBUTION FUNCTIONS, RATES, REPAIR, TIME

IDENTIFIERS: (U) PE61102F

AD-A168 526

AD-A168 524 13/9

MICHIGAN UNIV ANN ARBOR ROBOT SYSTEMS DIV

(U) Coordinated Research in Robotics and Integrated Manufacturing.

DESCRIPTIVE NOTE: Final rept. 1 Aug 84-30 Oct 85,

NOV 85 126P

PERSONAL AUTHORS: Atkins,D. E. ;Volz,R. A. ;Gilbert,Elmer E. ;Howe,Robert M. ;Irani,Keki B. ;

REPORT NO. RSD-TR-15-85

CONTRACT NO. F49620-82-C-0089

PROJECT NO. 2306

TASK NO. A3

MONITOR: AFOSR TR-86-0322

UNCLASSIFIED REPORT

ABSTRACT: (U) The research procured under this contract is oriented toward the understanding and development of the flexible robot based manufacturing cells or islands which will increasingly become basic blocks for the building of modern parts production and assembly facilities. Present work spans a hierarchy of sub-systems oriented toward the development and integration of high performance manipulators into flexible manufacturing cells. The research topics being pursued range from highly sophisticated and accurate control algorithms for robot arm control, new types of sensors, analysis and use of advanced sensors information, to higher level languages for robot control, integration of robot systems with CAD databases, and heuristic problem solving techniques.

DESCRIPTORS: (U) *ROBOTICS, *COMPUTER AIDED MANUFACTURING, ALGORITHMS, ASSEMBLY, CELLS, CONTROL, DATA BASES, DETECTORS, HEURISTIC METHODS, INTEGRATED SYSTEMS, INTEGRATION, MANIPULATORS, MANUFACTURING, PARTS, PROBLEM SOLVING, PRODUCTION, ROBOTS, COMPUTER AIDED DESIGN

IDENTIFIERS: (U) PE61102F

AD-A168 524

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 521 8/4

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF ELECTRICAL ENGINEERING

(U) Biological Visual Systems Structures for Machine Vision Applied to Robotics .

DESCRIPTIVE NOTE: Final rept. 15 Sep 84-31 Jan 86.

FEB 86 333P

PERSONAL AUTHORS: Inigo,Rafael M. ;Hsin,Chen H. ; Narathong,Chiewlarn ;McVey,Eugene S. ;Minnix,Jay I. ;

REPORT NO. UVA/525847/EE86/101

CONTRACT NO. AFOSR-84-0348

PROJECT NO. 2305

TASK NO. B4

MONITOR: AFOSR TR-86-0282

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes the research on a biological visual system (BVS) based sensor with possible applications to robotics and automation. The report covers the following subjects: sensor configuration; edge detection modeling for the human visual system and edge detection using the BVS sensor. qualitative motion detection using the BVS; Target tracking algorithms for the BVS; and Microsaccadic eye movement in the human visual system (HVS). Keywords: Machine visual sensor.

DESCRIPTORS: (U) *EYE, *ROBOTICS, *VISION, SPACE PERCEPTION, MORPHOLOGY(BIOLOGY), BIOLOGY, DETECTION, EDGES, EYE MOVEMENTS, MOTION, CONFIGURATIONS, DETECTORS, VISION, HUMANS, ALGORITHMS, TARGETS, TRACKING

AD-A168 521

AD-A168 501 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Stochastic Integration for Operator Valued Processes on Hilbert Spaces and on Nuclear Spaces. Revision.

DESCRIPTIVE NOTE: Technical rept.,

MAR 86 60P

PERSONAL AUTHORS: Korezlioglu,H. ;Martias,C. ;

REPORT NO. TR-85

CONTRACT NO. F49620-85-C-0144

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0328

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes AD-A158 878.

ABSTRACT: (U) The representation of a nuclear space valued square integrable martingale by means of another nuclear space valued sqare integrable martingale is given in terms of stochastic integrals of operator valued processes. The construction of the stochastic integral goes through that of operator valued processes on Hilbert spaces. A new approach is given for the Hilbertian case, so that only the integration of Hilbert-Schmidt operator valued processes is needed to represent square integrable martingales. (Author)

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, *OPERATORS(MATHEMATICS), HILBERT SPACE, INTEGRALS, INTEGRATION

IDENTIFIERS: (U) Martingales, Nuclear spaces, WUAFOSR2304A5, PE61102F

AD-A168 501

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 499 13/9 9/2

SRI INTERNATIONAL MENLO PARK CA

(U) Development System for Flexible Assembly System.

DESCRIPTIVE NOTE: Annual rept. 1 Feb 84-31 Jan 85,

FEB 86 70P

PERSONAL AUTHORS: Smith,Randall C. ;

CONTRACT NO. F49620-84-K-0007

PROJECT NO. 2308

TASK NO. A3

MONITOR: AFOSR
TR-86-0329

UNCLASSIFIED REPORT

ABSTRACT: (U) We have developed theoretical methods for improving the ability of a computer to estimate spatial relationships among objects when the relationships are uncertain; we have developed a very fast method for determining collisions between a robot and its environment in simulation, suitable for hardware implementation; we are developing a method for estimating the location of a workpiece in a manipulator's hand, by measuring forces and torques on the hand as it moves the object; and we are developing an interactive-graphic, off-line robot workcell programming, modeling, and simulation system, called WORKMATE. WORKMATE has been used to generate a demonstration pick and place task incorporating vision, executed in our laboratory workcell. This document includes the following papers: (1) 'On the Representation and Estimation of Spatial Uncertainty'; (2) 'Fast Robot Collision Detection using Graphics Hardware'.

DESCRIPTORS: (U) *ROBOTS, *ELECTROMECHANICAL DEVICES, *COMPUTER APPLICATIONS, ASSEMBLY, COLLISIONS, DETECTION, METHODOLOGY, OFF LINE SYSTEMS, THEORY, TORQUE, VISION, MANIPULATORS, INTERACTIVE GRAPHICS, COMPUTER PROGRAMS

IDENTIFIERS: (U) WORKMATE computer programs, WORKGATE(Workstation Modeling Analysis Training and Emulation), C programming language, LPN-SRI-7239, PE61102F, WUAFOSR2308A3

AD-A168 499

AD-A168 498 14/5 20/8

MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) Holographic Optical Elements Formed in Light of Reduced Coherence.

DESCRIPTIVE NOTE: Annual rept. no. 7, 30 Nov 84-30 Nov 85,

FEB 86 38P

PERSONAL AUTHORS: Leith,E. ;

CONTRACT NO. AFOSR-85-0012

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR
TR-86-0324

UNCLASSIFIED REPORT

ABSTRACT: (U) The theory of holographic optical elements (HOE) made with light of reduced coherence is developed. Both reduced spatial coherence and temporal coherence methods are considered. A theory of broad source fringe formation based on source image distortion is developed. The theory of HOE formation with two zone plates in tandem and under reduced temporal coherence is developed. A new technique of spatial filtering with spatially incoherent light was developed in which the optical system behaves as if the light were coherent (i.e., linear in amplitude and phase preserved) even though the light is spatially incoherent. A technique for obtaining resolution beyond the classical limit (superresolution) was discovered, based on the principle of incoherent to coherent conversion . Keywords: Hologram; Optical element; Interferometry; and Spatial filtering.

DESCRIPTORS: (U) *HOLOGRAPHY, *HOLOGRAMS, COHERENCE, COHERENT OPTICAL RADIATION, DISTORTION, IMAGES, INCOHERENT SCATTERING, INTERFEROMETRY, LIGHT, LIMITATIONS, OPTICAL EQUIPMENT, OPTICAL EQUIPMENT COMPONENTS, REDUCTION, SOURCES, SPATIAL DISTRIBUTION, SPATIAL FILTERING

IDENTIFIERS: (U) Superresolution, PE61102F,

AD-A168 498

AD-A168 498 CONTINUED

WUAFOSR230581

AD-A168 493 7/4 7/3

IDAHO UNIV MOSCOW DEPT OF CHEMISTRY

(U) Gas-Phase Structure of Perfluoro nitrosocyclobutane,

85 4P

PERSONAL AUTHORS: Marsden,Helen M. ;Oberhammer,Heinz ; Shreeve,Jean'ne M. ;

CONTRACT NO. AFOSR-82-0247

PROJECT NO. 2303

TASK NO 82

MONITOR: AFOSR TR-86-0328

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Inorganic Chemistry, v24 n28 p4756-4758 1985.

ABSTRACT: (U) Perfluoronitrosocyclobutane was prepared from nitrosyl chloride and perfluorocyclobutane in the presence of anhydrous KF and CH3CN. Both exo conformers (ax-exo and eq-exo) are compatible with experiment. The nitroso group causes considerable angle distortion of the cyclobutane ring. Keywords: Electron diffraction study.

DESCRIPTORS: (U) *ELECTRON DIFFRACTION, *CYCLOBUTANES, ANGLES, CHLORIDES, DISTORTION, RINGS, MOLECULAR STRUCTURE, VAPOR PHASES, SYNTHESIS(CHEMISTRY), REPRINTS

IDENTIFIERS: (U) Butane/Perfluoronitrosocyclo, PE81102F

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 491 20/4

MCDONNELL DOUGLAS ASTRONAUTICS CO-ST LOUIS MO

(U) Investigation of an Asymptotic Expansion Technique to Analyze Limit Cycle Response of Aerodynamic Surfaces with Structural Nonlinearities.

DESCRIPTIVE NOTE: Final rept. 13 Sep 84-13 Jul 85.

JUL 85 86P

PERSONAL AUTHORS: Hauenstein,Anthony J. ;Laurenson,Robert M. ;Quasser,John L. ;

CONTRACT NO. F49620-84-C-0123

PROJECT NO 2307

TASK NO. B1

MONITOR: AFOSR TR 86-0288

UNCLASSIFIED REPORT

ABSTRACT: (U) Defining the flutter and divergence characteristics of aerodynamic surfaces is a basic requirement in assuring structural and performance integrity of a given design for its operational environment. Divergence and flutter phenomena are unstable motions with increasing amplitude. For systems containing structural nonlinearities, another mode of aeroelastic response limit cycle oscillation may be present. The potential of limit cycle response is important since these oscillations may occur within the aerodynamic surface flutter and divergence flight envelope and may lead to fatigue damage of the system even though aeroelastic instability is not encountered. The objective of this thesis is to evaluate, on a comparative basis, different numerical simulation approaches for predicting limit cycle response of aerodynamic surfaces containing discrete structural nonlinearities. Results from such simulations are needed to compare and evaluate approximate solutions for the limit cycle response of nonlinear systems. In addition, these simulation results provide information concerning the nature of the nonlinear system response which may be used to aid in understanding the mechanism of the aerodynamic surface dynamics and in understanding the

AD-A168 491

AD-A168 491 CONTINUED

response of nonlinear systems in general. The numerical integration techniques selected for evaluation were: fourth-order Runge-Kutta, eighth-order Shanks, and fourth-order Adams-Moulton predictor-corrector. Results of the three simulation techniques compared well with each other. Keywords: Limit cycle oscillation, Structural nonlinearity, Flutter analysis.

DESCRIPTORS: (U) *AERODYNAMIC CONTROL SURFACES, *FLUTTER, *NUMERICAL METHODS AND PROCEDURES, *MATHEMATICAL PREDICTION, ASYMPTOTIC SERIES, DAMAGE, FATIGUE(MECHANICS), MATHEMATICAL MODELS, METHODOLOGY, MOTION, NONLINEAR SYSTEMS, NUMERICAL ANALYSIS, NUMERICAL INTEGRATION, OSCILLATION, SIMULATION, SOLUTIONS(GENERAL), THESES, DYNAMIC RESPONSE, CYCLIC TESTS, AEROELASTICITY

IDENTIFIERS: (U) PE81102F

AD-A168 491

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 487 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Estimating Weights in Heteroscedastic Regression Models by Applying Least Squares to Squared or Absolute Residuals.

DESCRIPTIVE NOTE: Technical rept. Aug 85-Aug 86,

OCT 85 40P

PERSONAL AUTHORS: Carroll,Raymond J. ;Davidian,Marie ; Ruppert,David ;

REPORT NO. MIMEO- SER-1584

CONTRACT NO. F49620-82-C-0009

MONITOR: AFOSR TR 88-0318

UNCLASSIFIED REPORT

ABSTRACT: (U) This document considers a nonlinear regression model for which the variances depend on a parametric function of known variables. The authors focus on estimating the variance function, after what it is typical to estimate the mean function by weighted least squares. Most often, squared residuals from an unweighted least squares fit are compared to their expectations and used to estimate the variance function. If properly weighted such methods are asymptotically equivalent to normal-theory maximum likelihood. Instead, one could use the deviations of the absolute residuals from their expectations. Constructed is such an estimator of the variance function based on absolute residuals whose asymptotic efficiency relative to maximum likelihood is precisely the same for symmetric errors as the asymptotic efficiency in the one-sample problem of the mean absolute deviation relative to the sample variance. The estimators are computable using nonlinear least squares software. The results hold with minimal distributional assumptions. (Author)

DESCRIPTORS (U) *WEIGHTING FUNCTIONS, COMPUTER PROGRAMS, ERRORS, LEAST SQUARES METHOD, MATHEMATICAL MODELS, MAXIMUM LIKELIHOOD ESTIMATION, MEAN, NONLINEAR ANALYSIS, PARAMETRIC ANALYSIS, REGRESSION ANALYSIS, RESIDUALS, SAMPLING, SYMMETRY, VARIATIONS, ESTIMATES

AD-A168 487

AD-A168 484 17/2.1

SOUTHERN METHODIST UNIV DALLAS TEX DEPT OF ELECTRICAL ENGINEERING

(U) Spread Spectrum Mobile Radio Communications.

DESCRIPTIVE NOTE: Interim rept. 1 Sep 84-31 Mar 86,

MAR 86 108P

PERSONAL AUTHORS: Gupta,S. C. ;

CONTRACT NO. AFOSR-82-0309

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR TR-86-0323

UNCLASSIFIED REPORT

ABSTRACT: (U) In this report we present some additional results on the performance of carrier sense multiple access (CSMA) protocol for mobile packet radio networks (MPRNET). This is followed by a review of bandwidth efficient digital modulation for mobile radios and some results on a speech transmission scheme and an analysis of mismatched continuous phase FSK (CPFSK) receivers. Carrier sense multiple access protocol has been analyzed in detail for mobile radio channel. Throughput and delay expression are derived to include the effects of fading. The performance degradation due to hidden terminal problems is analyzed. This is followed by an evaluation of the performance of CSMA with collision detection (CSMA-CD) for FH-FSK spread spectrum mobile packet radio networks. A class of spectrally efficient modulation has been reviewed for application to mobile radio systems. A speech transmission scheme using DPCM coding and these spectrally efficient modulation is seen to compete with existing schemes. Mismatched CPFSK receivers have been analyzed to understand how time and phase synchronization errors influence the performance. A set of curves is provided to demonstrate the degradation due to imperfect carrier phase of symbol time synchronization error for both low and high SNR.

DESCRIPTORS: (U) *COMMUNICATIONS NETWORKS, *PACKETS,

AD-A168 484

AD-A168 484 CONTINUED

•COMMUNICATION AND RADIO SYSTEMS, •RADIO TRANSMISSION, •SPEECH TRANSMISSION, CHANNELS, CODING, COLLISIONS, DEGRADATION, DETECTION, DIGITAL SYSTEMS, ERRORS, MOBILE, MODULATION, RADIO EQUIPMENT, SYMBOLS, SYNCHRONIZATION(ELECTRONICS), TIME

IDENTIFIERS (U) PE61102F

AD-A168 484

AD-A168 481 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) A Note on Adapting for Heteroscedasticity When the Variances Depend on the Mean.

DESCRIPTIVE NOTE: Technical rept.,

OCT 85 20P

PERSONAL AUTHORS: Carroll,Raymond J. ;Ruppert,David ; Stefanski,Leonard A. ;

REPORT NO. MRS-1583

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0316

UNCLASSIFIED REPORT

ABSTRACT: (U) This document considers the normal-theory regression model when the error disturbances are heteroscedastic, i.e., have non-constant variances. The author distinguishes two cases: 1)predictor heteroscedasticity, where the variances depend on a function g of known quantities and 2) mean heteroscedasticity, where the variances depend on a function g of the means. For the case where g is unknown, Carroll showed by construction that, in certain cases, it is possible to estimate the regression parameter asymptotically as well as if g were known and weighted least squares applied. This document reconsiders this problem from the information bound theory of Begun, Hall, Huang & Wellner. For mean heteroscedasticity, a rather surprising result is obtained. If g were known in this case, Jobson & Fuller showed that the maximum likelihood estimate is asymptotically more efficient than weighted least squares with known weights. When g is unknown the full Jobson & Fuller improvements are not possible; however, we show that one can, in theory, attain asymptotically better performance than weighted least squares with known weights. Keywords: Adaptation; Linear models.

AD-A168 481

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN34M

AD-A168 481 CONTINUED

DESCRIPTORS: (U) *REGRESSION ANALYSIS, ASYMPTOTIC NORMALITY, ANALYSIS OF VARIANCE, ERRORS, PARAMETERS, LINEARITY, MATHEMATICAL MODELS, LEAST SQUARES METHOD, WEIGHTING FUNCTIONS

IDENTIFIERS: (U) *Heteroscedasticity, Maximum likelihood estimation